The Manufacturing and Construction Journal of the Textile Industry

COTTON

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Quicker Sales for Pine Tree Crepe

—how Kaumagraphs made it possible

"YES," said the weary sales girl who had hitherto shown little interest in the transaction, "this material is washable."

But this assurance failed to satisfy the customer. "How do I *know* it is washable?" she meditated. "Maybe the girl's just saying so to make a sale. What proof have I—what protection? . . . I don't think I'll take it."

* * *

Instances like these, take it on authority, have been a constant brake on dealers' sales. The authority is Mr. Walter Johns, L. Dannenbaum's Son & Co., Factors, Pine Tree Silk Mills.

Some months ago, says Mr. Johns, his company conceived an idea:—why not stamp the word "washable" right on the goods? What better way to convince the customer? What better way to help the dealer and his sales people?

So they tried out the idea on just one of their fabrics—Pine Tree Crepe. Well, it proved such a boon to the trade that L. Dannenbaum's Son & Co. found it profitable to extend the idea to other fabrics. For dealers say it is one of the most profitable ideas for quicker sales that they could have been given.

"Of course," says Mr. Johns, "the execution of the idea was made possible only by the cooperation of the Kaumagraph Company. For with Kaumagraph Transfers we apply the word "washable" at regular intervals along the selvage of the fabric. I know of no other method that stamps the mark so clearly, and at the same time strikes the edge so evenly."

Based on an interview with

MR. WALTER JOHNS,

L. DANNENBAUM'S SON & CO.,

Factors, PINE TREE SILK MILLS

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COTTON

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When changing address notify us, not the postmaster. Always give the old address as well as the new one.

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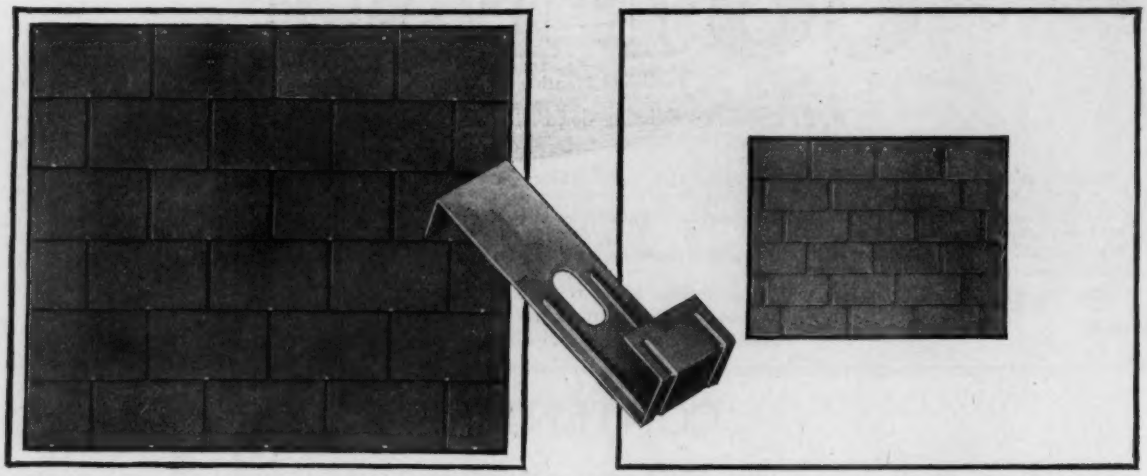

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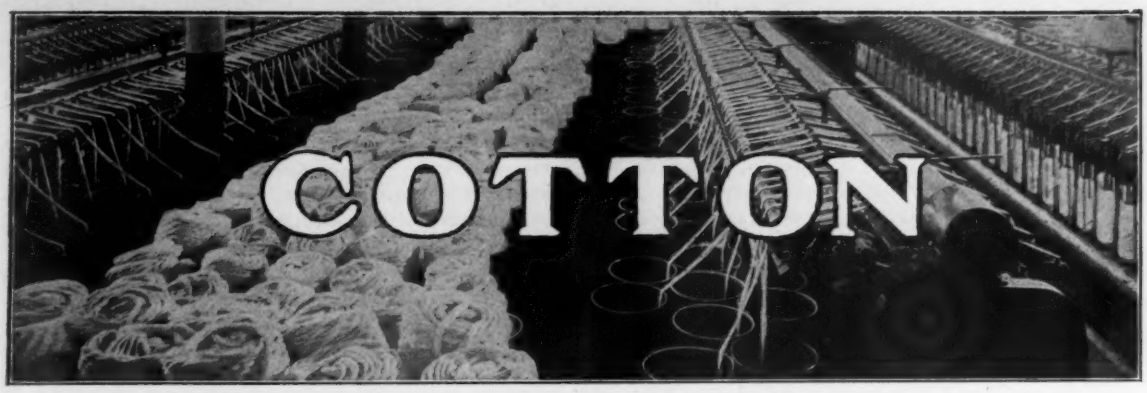


February, Nineteen Twenty-Seven

Taming the Wild Statistic.

"It is doubtful if in our future economic history there ever will be recorded another melancholy event like ones of the kind known as the 'panic of '93' and the 'smash of 1907'" declared the probably foremost ruling authority on business and economics recently. "The business tide will ebb and fall, for reaction must always follow action. We will continue to have periods of prosperity, succeeded by ones of slack, but I do not believe that there will be another world or nation-wide panic, marked by general collapse, a scurrying of capital from all the marts of trade, and the dominance of fear in every quarter. And it is doubtful if there will be another of those periods known as boom ones, marked by intense artificial inflation, super-speed, universal speculating, over-production in every quarter—and then a collapse."

The reason he gave for these beliefs is that the principal factors entering into the making of those economic occurrences which rank in history along with great wars have been brought within reasonable control, particularly so in this country. A chief one is the machinery of credit, which in the past was inclined to run in "good times" with ever increasing speed until brought ultimately to a sudden stop by over-strain. The changes made in this machinery during the last fifteen years, changes that tie-up in the Federal Reserve System, together with what has been learned about operating it, have made it possible to control credit machinery so as to keep it from going too far or falling too low.

Another thing that helped to bring on booms, followed inevitably by smashes in the past, was the tendency of production in 'good times' to advance beyond consumption to the point that suddenly there had to be a stop and a wait for consumption to catch up. This meant periods of idleness for both labor and capital—periods marked by "hard times" everywhere.

In industry, aside from farming, this probably has been brought within more assured control than credit—for the experience of 1921 showed that much was yet to be learned about the last.

The factor of production has been brought within control largely through the increase of authentic information, notably that of the statistical kind. As the world now moves along a vast statistical record is made of its transactions and this, in the main, is open to anyone who wishes to observe it. This record has been amplified 100 per cent or more since the World War. In this country, where business and industrial statistics formerly were not as complete as those of some other countries, the record now is several times bigger than before the war. And it still is increasing. The collecting, digesting and distribution of statistics has become truly a big industry, engaging the labor of thousands of persons, and the thought of many of the most capable minds in both academic and practical realms.

The record is now so complete that practically any manufacturer, any business man, any banker can visualize the economic set up which daily affects his affairs. He can tell when production is becoming abnormal, when prices are being inflated, and, if wise, take due precautions against dangers thus envisioned.

Booms with consequent smashes will continue to occur in segments of the economic world, but that world is now more immune than ever before from the contagion which these segregated rises and falls carry.

One prime factor in the equation has not been removed and never may be. This is the effect of natural conditions, notably the weather, which as yet cannot be long anticipated. Yet re-adjustments from disturbances brought about by these conditions can be made more quickly than ever before.

The things which made principally for the historic panics of the past were rooted in fear which owed to ignorance. This last has been veritably overcome through the collection and distribution of detail information particularly of the statistical kind.

This information is usually of the "drab" sort and is therefore passed up by many who might make valuable use of it. But much of the traditional repugnance of statistics owes to prejudices taken over without examination. In fact, statistics can be, and to the energetic mind usually are, as fascinating as written romance. Men of course can lie with figures as with words but it is much easier to catch them when figures are the medium.

The bulk of statistics now accepted by knowing folk are collected with as great care and honesty as are facts having to do with the natural sciences. And with the aid of such devices as the index number, hordes of complex ones are now set forth in as simple a form as are lessons in first grade school readers.

Business men who now ignore authentic statistics are, to use a statistical simile, back numbers.

New Methods of Harvesting Cotton.

There appeared in the market about four years ago, what is known, broadly, as "gathered" as against picked cotton. It has come forth in increasing quantities since then, and amounts now some estimates say, to two million bales or more of the 1926-27 crop. "Gathered" cotton is marketed chiefly in Northwest Texas and Southwest Oklahoma, where hand picking has almost ceased to be practiced.

It resulted in the beginning from "stripping". In the new cotton country of the near West, where cotton growing presses closely on the early frost line, the maturing of many bolls is stopped sometimes by cold weather. The new growers went out and stripped these off the plants, ran them, at first through wheat threshers, and then took the product to the gins which separated the low grade lint from the chaff. Cotton growing has increased in that new area far beyond the supply of hand pickers. There are records showing that as much as 500 acres are often planted and cultivated, with machinery, by a single man.

In order to get the cotton out of the fields "snapping" has been resorted to during the last two or three years. This consists of merely breaking off the opened bolls, and, sometimes, "bollies" too, which are sent to the cleaning machines and gins which do the real picking. The lint turned out is not as clean as it would be if picked. There is an undue mixing of lengths and strengths. The cotton classes two to three grades below what picked cotton from the same fields attain.

Controversy has gone on between growers and buyers and between the latter and spinners who have tried to use "gathered" cotton concerning the real worth of this substantially new class of cotton.

Tests made by U. S. Department of Agriculture specialists indicate that the spinning qualities of "snapped" cotton are about the same as those of picked cotton from the same fields. The tests were made with cotton "snapped" and picked from paralelling rows in Oklahoma and Texas fields. The picked graded low middling, the "snapped" good ordinary.

During the present season a more rapid and problematical method of gathering was used in the West Texas area. This is known as "sledding." A huge sled-like box, with extended prongs, is dragged over the rows, and cotton, bolls, leaves, everything, is stripped from the plants by a single operation. By this method a man with team or tractor can harvest six to eight bales a day.

The gins manage to separate the lint from the foreign matter, but the staple has been classed by buyers three to four grades below the run of picked cotton in that area. The offset about equals the saving in gathering cost. Unless utterly vetoed by the mills, more and more cotton will be gathered in that way; for the method makes it possible for growers in the new cotton country to harvest as much as they can plant and cultivate. The method no doubt will be improved. Further improvement in ginning devices may perfect it. It probably means a continuing huge supply of at least low grade cotton, which will be produced, in West Texas, at remarkably low cost.

These new gathering methods constitute a factor of possibly immense import to the cotton growing and consuming world. They weigh against curtailment of production in the Western area, where increased acreage in cotton accounts more than all else for the bulge in cotton production in 1925 and 1926. They may tend to make cotton growing more Western than Southern.

If another promising development matures, still more radical changes will take place. This is the prospect of a successful mechanical picker, two types of which are expected to be on the market before the next season begins. Both have stood experimental tests. They pick as good cotton as that gathered by hand and enable one man to do what twenty to forty now do—that is, if the pickers work in practice. Each of them is of the spindle type, being progressions of the Price-Campbell picker which about fifteen years ago came close to the goal which has been sought by a thousand would-be Whitneys.

In any event the spinning industry evidently must prepare to deal on a large scale with cotton that was gathered by some kind of mechanical process.

Not Beyond Recourse.

Recently a Federal judge was arraigned before the United States Senate on charges of impeachment made by the House of Representatives. Involving little that was of national interest, the case attracted no great amount of attention outside of circles immediately concerned with it. At the last moment the accused judge resigned and avoided a trial which would have been the tenth one of the kind that has taken place since the Federal Government was established.

The number would seem to indicate that Federal officials have been unusually upright or that the process of impeachment is an impracticable method of dealing with high "crimes and misdemeanors" committed in office. In the case of Federal judges, for example, impeachment is the only process by which incompetency as well as official misconduct can be dealt with appropriately. These judges have life tenures of office.

The recent case brought out, or to mind, certain facts which are not commonly known. In this case, for example, proceedings were not initiated—as is generally assumed to be the only way—by a member of Congress rising in his place and formally impeaching the accused. No member, is seems, was willing to do that. Hence private citizens in the judge's district made formal charges against the accused. These, being directed to the Speaker of the House, could not be ignored. Thus the process leading to impeachment was begun. And any citizen or group of citizens can similarly start the process by proceeding likewise against a Federal judge or other official. It doesn't mean that impeachment will result, but it does mean that the House of Representatives must look into the matter with that possible end in view.

The number of impeachments, particularly of Federal judges, would be larger but for the fact that a mere beginning of the process often has achieved needed relief. A large number of judges have resigned, as did the recent one, rather than face formal charges, and mere investigation or threat thereof has often caused others to correct their ways.

While the Federal judiciary as a body has a fine record for uprightness, the security of places therein has often abetted abuses of power. But that security is really not as unyielding as it seems to be.

Keeping Even Numbers in Spinning

By DUNHILL MARSDEN.

A good many mills seem to keep their shop force constantly making sets of gears for various changes. These changes seem to be due sometimes to violent variations in numbers in the spinning room and on the warper beam weights. I know of mills that have a variation of as much as 30 or 40 pounds in warper beams of the same set with the same number of ends of like yarn. This, as we know, results in bad variation in cloth weights.

When the cloth weights vary very much there is a rush to lighten or heavy the filling to correct this. Before this change has taken effect in the weave room the pendulum may swing the other way and the mill organization of overseers is constantly changing numbers to try to outguess the cloth weights.

Now, if numbers are kept very even, with only slight variations giving perhaps three to five pounds variation in warper beams at the maximum then the cloth weight will remain about constant. It is the purpose of this article to outline a system of keeping numbers whose variations are held at a minimum and also giving warper beams of only slight variation in weights. Uniform warp yarn will give much better weaving in that there is no light yarn in the warps to run badly.

To begin our system, let us go back to the opening and picker rooms Cotton of uniform character we know must enter the mill, also cotton of uniform grades and staple. None of these characteristics can be re-made if it is lacking in the beginning of the journey through the mill.

Assuming that we have been given good cotton to start with, it should be well opened and aged at least 24 hours to give an even distribution to the moisture that was contained in the bales originally.

In going through the pickers the cotton again has the opportunity to adjust itself to a uniform moisture content, besides the advantages of the mixing by doublings. The finisher lap should be kept to a minimum variation of one-half pound each way, under and over. Any laps that vary more than this should be set back and run over again.

Careful "piecing-in" at the card should be done. In fact, at our mill it is the rule to break down the end at the coiler head while "piecing-in." This will help to minimize a lot of variation.

Let us view the cotton in passing through the card. This heavy sheet of cotton in lap form is taken by the licker-in in minute quantities and subjected to a violent action on the part of the air currents of the cards. Here, the cotton on passing around the cards is conditioned to whatever regain of moisture corresponds to the relative humidity of the card room. On this fact hinges the theory of our system, which I am about to explain.

The cotton passes out of the card in a web form, again further adjusting itself to the relative humidity of the card room.

The sliver passes through the first drawing down to the second drawing, where we believe our sliver is at a uniform percentage of regain in accordance with the relative humidity of the card room.

On a post right at the second drawing in our mill hangs a recording hydrometer. It records the relative humidity of the card room at this position, which is the second drawing. I have already tried to emphasize that at this point the sliver is thoroughly conditioned in accordance with the relative humidity of the room.

From our experience in running the mill we have found that at 50 per cent relative huimidity in the card room, the drawing sliver should weigh 47.75 grains per yard to give the proper weight for the finished cloth, all other things being equal. So with this as a basis, we calculate a table of standard weights for our finisher drawing sliver which at all points of the relative humidity table has always the same amount of bone dry cotton in it. The variations in the standard are due only to the variations in moisture content resulting from changes in atmospheric conditions.

An example of a table adapted to a print cloth mill is given herewith:

TABLE OF FINISHER DRAWING STANDARDS.

Relative Humidity	Per Cent Regain	Drawing Standard
40	5.1	47.33
41	5.2	47.37
42	5.3	47.42
43	5.4	47.46
44	5.5	47.51
45	5.55	47.54
46	5.65	47.58
47	5.7	47.61
48	5.8	47.65
49	5.9	47.70
50	6.0	47.75
51	6.1	47.80
52	6.2	47.84
53	6.3	47.89
54	6.4	47.94
55	6.5	47.99
56	6.6	48.03
57	6.7	48.08
58	6.8	48.13
59	6.9	48.18
60	7.0	48.23
61	7.1	48.28
62	7.25	48.35
63	7.4	48.42
64	7.55	48.49
65	7.7	48.56
66	7.85	48.63
67	8.0	48.70
68	8.15	48.77
69	8.3	48.85
70	8.45	48.92
71	8.6	48.99
72	8.75	49.06

Using the percentage of regain in the table, the standards may be figured for any given weight sliver. Say, for instance, that a coarse mill is running about a 60-grain sliver. Then let 60 grains be the standard at 50 per cent relative humidity, which represents 6.0 per cent water. Then at 51 per cent relative humidity the regain is 6.1 or in other words, there is .1 per cent more water in the cotton sliver, or the standard for 51 per cent would be 60.06 grains and for 52 per cent the excess water is .2 per cent, and the standard would be 60.12 grains per yard. In this manner we figure what the standards are for all possible conditions of relative humidity. Then we have a table to work on.

Now we come to the operation of the table. We weigh or size from each delivery of finsher drawing at the same time reading the hydromter to learn the relative humidity. We next average the weight of all of our sizings and then turn to the standard of weight on the table we have calculated. If the average of our sizings varies over *one-half grain* from the standard corresponding to the relative humidity in the table—either light or heavy—we immediately change the crown gears on the finisher drawing to bring the average weight as near to the standard in the table as possible.

This sizing is made twice daily and twice at night—the mill is on night shift—and should the average of the sizing vary as much as one-half grain from the standard corresponding to the relative humidity of the card room we immediately correct it with the crown gears on this finisher drawing. The time of the day sizing is 9 A. M. and 3 P. M.

We have operated this system for several years now—we never have to change gears in the spinning room, our numbers never vary over 1½ to 2 numbers at a sizing. Our warper beams do not vary over four pounds to a set or for a long period of time. The system is original with us so far as we know, never having heard of one exactly like it before. It is very simple once we see the principle of it.

To go further into the theory, it has been my experience, after testing for variations in some twenty-five mills, that at no point in the mill is the product more even than at the finisher drawing. If we keep it as even as humanly possible at this point it will remain even throughout its course through the mill so long as all of the machines draft and twist alike. In fact, I believe that by the operation of the system outlined, a mill can be made to operate as nearly perfect in the spinning room as is humanly possible. The work runs along day after day, week after week, with almost seemingly effortless attention—yet there must be constant vigilance in the card room over this system, never allowing a sizing to go uncorrected if a correction is needed.

In closing, I will say the reward of good running work will many times repay the efforts put forth in maintaining the system. I might add that in the mill where this system is operated, several years ago it was necessary to have a new set of spinners every few weeks, while now we hardly ever change a single hand. The system is practical and it pays handsome dividends, too.

"Ambition, great ideals, right hopes call for effort, exercise and efficiency, and while these words all commence with E's, yet the words mean the opposite of ease."

Wage Payment Methods in Industry.

The accompanying graphic chart presents the results of a recent survey of wage payment methods in forty industries as prepared by the Technical and Industrial Research Division of The Sherman Corporation. Over a half million employees are represented in these findings. The percentages of straight time, piece work and premium or bonus methods are percentages of employees and not percentages of plants.

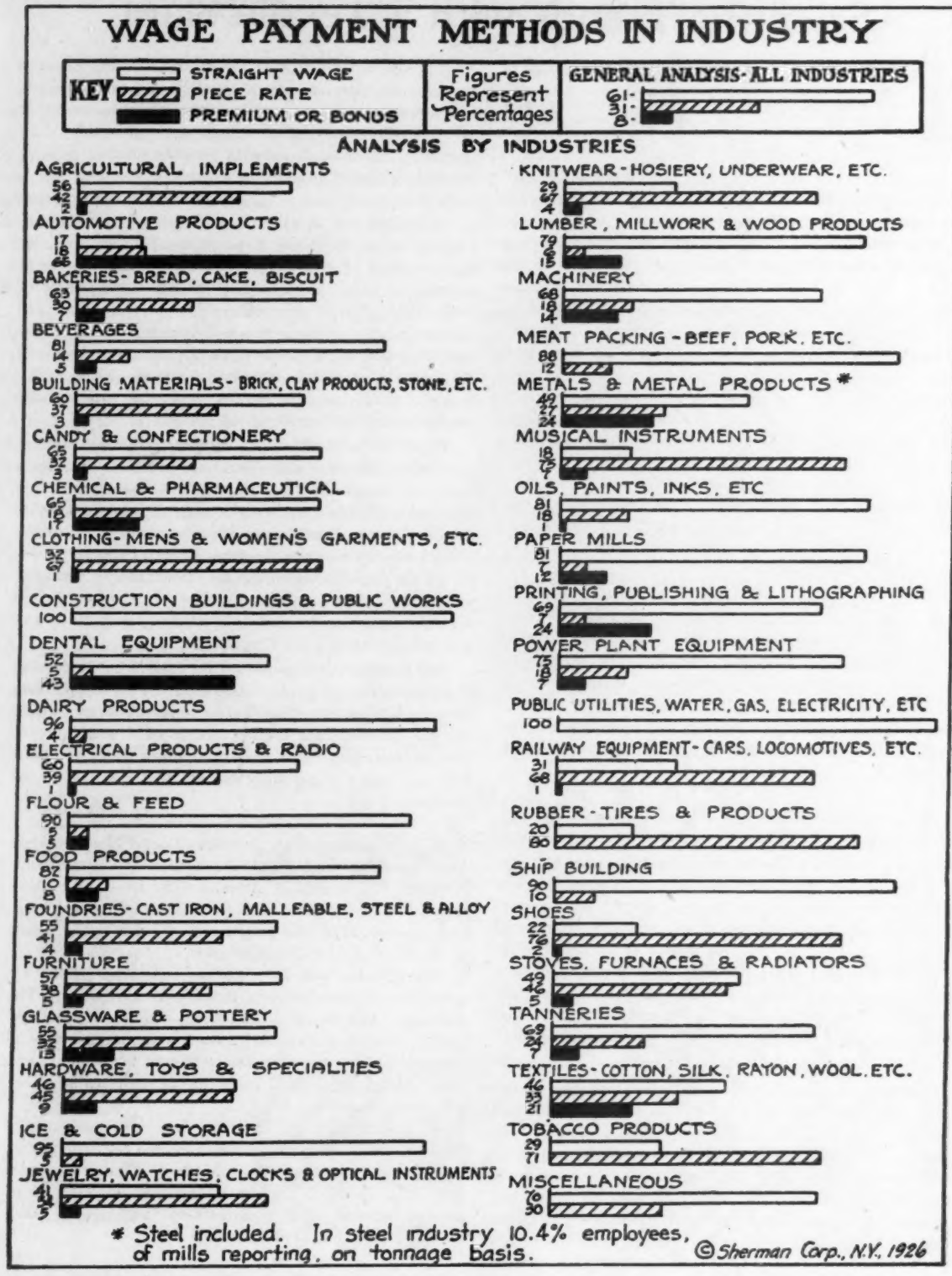
There are relatively few plants in which straight time payment is exclusive, although in industries such as Construction and Public Utilities this payment method is the only one in use. But in the plants using some form of wage other than straight time, a great many workers are left untouched by the incentive basis. The number of employees affected by advanced forms of wage payment, exemplified by the individual or group bonus methods, is surprisingly small, only 8 per cent, as shown by the figures of general average. However, premium or bonus is included only when it was stated as a systematic part of the wage payment plan and not merely an occasional, opportunistic distribution.

It is significant that the Automotive Industry leads in percentage of workers on premium or bonus, 65 per cent under some premium or bonus method. Productivity of labor in this industry per man hour has increased over 200 per cent in ten years. Six billion dollars annually in wages are disbursed. The industry's financial structure has grown tremendously. The distribution of its products over a wider and wider population is one of the wonders of the entire business world. So the question naturally arises whether present policies in wage payment have had a definite influence on these specific facts? Certainly no one will dispute the conclusion that industry generally is needing a means of paying its huge wage disbursements so that incentive will get to work in favor of increased profits through lower costs, as well as increased employee earnings.

The chart referred to will be found on page 323 of this issue.

Proctor & Schwartz, Inc., Philadelphia, Pa., have issued an interesting folder describing the new Proctor air-dryer for dyed, bleached, mercerized or sized cotton warps. Several new features are are explained. In this dryer, it is stated, the warp is kept moving continuously by a series of rollers, through mild cross currents of moderately heated air, threading its way around the rollers and across the stretches of air space between parallel sets of these rollers. All the ends of a full set of warps are handled simultaneously and automatically, the strands of two, four or more warps entering the machine through porcelain pot eyes and moving through it in separate paths. Shading in dyed warps and hard spots in sized warps, it is claimed, are eliminated by the continuous progress of the warps through the machine.

T. B. Wood's Sons Company, Chambersburg, Pa., have issued Catalogue No. 70 of their power transmission machinery, which supersedes previous issues. In addition to describing the company's comprehensive line of equipment, the book also contains a number of general formulae and data relating to power transmission.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MEAT PACKING - BEEF, PORK, ETC. 88 12
METALS & METAL PRODUCTS * 49 27 24
MUSICAL INSTRUMENTS 18 75 7
OILS, PAINTS, INKS, ETC 81 18 1
PAPER MILLS 81 7 12
PRINTING, PUBLISHING & LITHOGRAPHING 69 7 24
POWER PLANT EQUIPMENT 75 18 7
PUBLIC UTILITIES, WATER, GAS, ELECTRICITY, ETC 100
RAILWAY EQUIPMENT - CARS, LOCOMOTIVES, ETC. 31 68 1
RUBBER - TIRES & PRODUCTS 20 80
SHIP BUILDING 90 10
SHOES 22 76 2
STOVES, FURNACES & RADIATORS 49 46 5
TANNERIES 69 24 7
TEXTILES - COTTON, SILK, RAYON, WOOL, ETC. 46 33 21
TOBACCO PRODUCTS 29 71
MISCELLANEOUS 70 30
* Steel included. In steel industry 10.4% employees, of mills reporting, on tonnage basis.
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A brief description of the source of the facts concerning wage payment methods as shown graphically herewith will be found under a similar heading on page 322 of this issue.

Scientific Trends with a Textile Slant

"Men," said one authority, "are nothing, but a man is everything."

Or, as a more recent chronicler put it: "Presiding upon event everywhere was one man's character—and that endures."

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It was a pretty poor team, but it *did* have one "back" who could punt the ball eighty yards down the field when he was called upon. He had just done so, removing the visiting team from the status of a threat into the precarious region of their own goal. Then a fumble gave *us* the ball on their fifteen yard line. The first two quarters had proven how hopeless it was for us to try line-bucking —we simply didn't "have it" against that team. But this punting back *could* make end runs. So he was called upon again and made eight yards. Then a futile attempt through guard was stopped dead. Followed a trial of a pass, which was knocked down. Close to the sidelines, the end run was the only hope, but these rapid plays had left the team's hope spent, limping and winded.

Yet, once again the "back" gathered himself, caught the snapped ball, and whirled around the end, tackled, but over. Our one score, our only "break" in the game—and victory.

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Now I have heard moralists, theorists and organization experts from Maine to the Mississippi prove that team work is the thing that wins, yet here, where team work had no possible chance of anything except failure, *a man* gave the extra ounce, when he was called upon, that won.

You *may* be able to train up team work that will win, but in the emergency you have to call upon the *man* because there isn't either time or opportunity for this "organizing."

• • • • •

Now what we want to know is this: How do you *ever* know when you can count on "organization" for success? In this year of "dope" and championship upsets how will you presume to pin your faith and the success of your ventures on method rather than on men? Well enough to provide all that organization will give you—you would be a dub to ignore the obvious lessons of experience—but don't sit back and *depend* upon it. Build *men*, pick *men*, place *men* in key positions, so that when "the extra ounce" is needed you will have, at the "quarter's signal," that which you could never get from all your "best laid plans."

• • • • •

There is a type of public utterance that gets people into print, but is only as useful as the aeroplane that brought Gene Tunney to the stadium—it doesn't *win* fights. We refer to the "remedy suggesters" who arise with every business crisis. It is no use to deny the correctness of their conclusions, "something *must* be done," and frequently the very thing they describe in their generalizations is logical, but even as they tell the gathering of important citizens their conclusion, some ordinary person who thought of the same thing months earlier has progressed so far in the practice of his thought that he is even then putting the machinery in motion which is slowly, (but surely), and not at all spectacularly, getting out the yardage, selling the product of those "surplus bales" *at a profit*.

It would be enlightening to get statistics on the ratio of *additional* bales utilized this year: 1. By speechmakers. 2. By creative mill men and stylers. Every newspaper crys "develop new and additional uses of cotton" but, ultimately, the most *un*economic possible solution is being resorted to, that of production control.

It is especially unfortunate that as make-shift a method as this should be the best one to which we can resort. Finance is not, nor can it be expected to be, creative. The economics of natural resources may be altered only by creative methods: you can not *finance* the ripening of corn, although you can underwrite its cultivation and marketing. My criticism is not of the methods of finance but rather that we, who control the destinies of output, and the methods, should so far fall short of what might logically be expected of us that we leave such a large proportion of this burden to the financiers.

From all sections of the country where peculiar problems of industry and agriculture press for solution is heard the complaint "the banking code is inadequate to the problem." And so, also, is a fishing-rod in hunting elephants. But there is one inherent fault of ourselves, which long dependence upon banking, has, perhaps, fostered, we are prone to bet on figures rather than on character and ability. Right now is the time when we must face squarely about, in our methods, if there is ever to be any hope for betterment and progress.

The problem is not to control production but to develop that production for profit. And in this work will be room for a lot of elements—from banker to Mr. Average Citizen. Do not underestimate the importance of a single factor, because in all sections of this are problems where you must have the man who not only *can*, but who *will* call up his reserve.

A joint meeting of the American Cotton Manufacturers Association and the National Association of Cotton Manufacturers will be held at Atlantic City, N. J., from May 12th to 14 th inclusive, it is announced. The convention will be held under the auspices of the National Council of American Cotton Manufacturers.

This meeting will be a further indication of the cooperation of manufacturers throughout the nation. The American Association is comprised mainly of southern textile men, the National Association's membership is practically all in the northern section of the country, and the National Council is made up of representatives of both associations.

The Cotton-Textile Institute, Inc., will undoubtedly form the basis of much discussion at the convention, formal, and informal, and the subjects of finding new uses for cotton goods, improving styling methods, etc., all of common interest to all manufacturers, will also be taken up either in or out of the sessions.

J. E. Sirrine & Company, Engineers, of Greenville, S. C., announce the opening of a branch office in Birmingham, Ala., in charge of G. P. Patterson, who has been with the company for seven years. This is the second branch office the company has established, the first being opened in Chattanooga two years ago.

Designing for Figured Ginghams

By OSBERT HUGHES.

Standard ginghams, in the past, have mostly been made on the order of plain weave, one up and one down, and have been chiefly dependent for their decorative patterns upon stripes and check effects. Recent styling, however, has produced a type of gingham introducing a two by one twill weave construction, whose patterns are formed on a distinctive block motif. This form of weave allows a style of design that cannot be obtained on the ordinary plain weave fabric. Also, these styles can be so designed as to form exact reversible patterns.

One such fabric is illustrated in Fig 1, with the draw ing-in draft and harness chain shown in Fig. 2 and Fig. 3. The construction is 82 x 54, using a 23s warp and a 30s filling. It will be noted that the blue shaded block is woven 2 up and 1 down, and the white block 1 up and 2 down. On the reverse side of the goods, the blue block appears as white and the white as blue. This pattern requires six harnesses, with two extra for the plain weave selvages, a total of eight harnesses.

It is important that the two twills, 2 x 1 and 1 x 2, should be so arranged as to lock each other, as shown in Fig. 4. This insures a good clean edge, instead of the ragged appearance that would be otherwise obtained.

When making samples of these styles it is advisable to use drawing-in draft that will cover as many of the patterns planned as possible. All the patterns may then be woven on the same warp, with no further change than putting a different chain on the dobby. When the patterns are taken to the weave shed, the drawing-in drafts most suited to the various styles should be used.

A great many varieties of block patterns ranging from a single checker-board effect to the most elaborate forms, can be made in this manner, the designer being only limited by the capacity of the dobby and the length of chain practicable in the weave shed. Many original block patterns may be planned by using faintly ruled square paper and filling in the squares until the desired forms are obtained. This may seem a childish exercise, but should

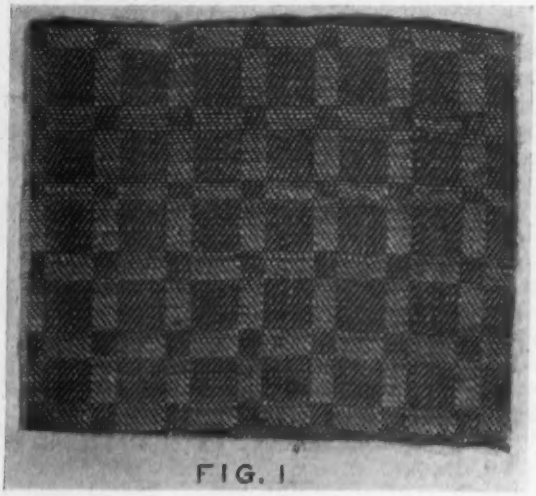
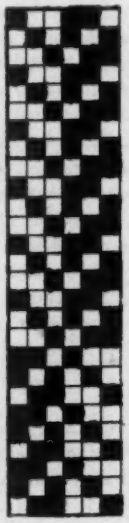
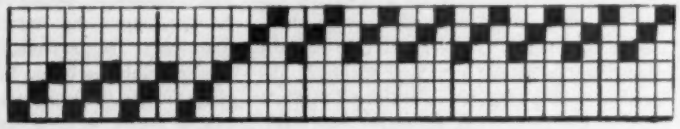


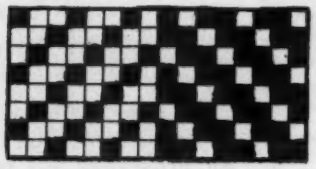
FIG. 1



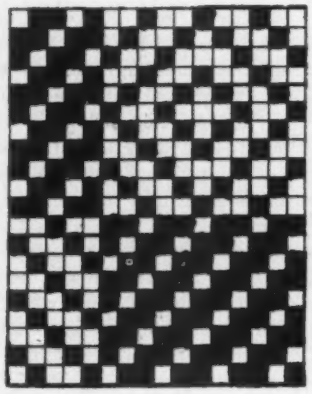
CHAIN HARNESS
FIG. 3



DRAWING-IN DRAFT
FIG. 2



2 x 1 TWILL
FIG. 4



DIAMOND PATTERN
FIG 5

by no means be beneath the designer desirous of obtaining original and effective patterns.

These styles may be further elaborated by using a striped warp and weaving on a box loom. For instance, on the fabric shown at Fig. 1, in place of a solid colored warp, the warp could be laid in as follows:

12 ends white; 24 ends blue, and the boxes raised in the following order: 8 picks white; 16 picks blue. This would give three shades or effects in the cloth, e. g., a blue shade where the blue warp is interlaced with the blue filling, a blue and white mixture where the blue and white warp and filling are combined, and a solid white block where the white warp and filling interlace. This pattern would then be exactly reversible. The colorful effect thus obtained can be further enhanced by extra colors in the warp stripes and using three or four boxes. Or very novel and effective patterns may be made upon a rainbow-striped warp and using one color of filling.

A wide and useful range of styles can be created by using the same ornamental forms on both solid warps and striped warps. The simple construction and drawing-in arrangements of these patterns render them especially adaptable for the easy manufacturing of samples.

Other variations of the same goods may be made by a combination of plain weave, 2 x 1 twill, and possibly some 3 x 1 or 4 x 1 bunched cord effects. Such patterns would necessitate placing the 2 x 1 twill upon 6 harnesses, if it is desired to weave plain weave on the same ends as the 2 x 1 twill. Some very interesting check patterns may be made in this manner. Where some ends are bunched as cords, and woven as 3 x 1 or 4 x 1, it may be found necessary to place them upon a separate beam, to compensate for the difference in the take-up of such ends and those ends woven as plain weave. The ever useful diamond shape, on a plain weave ground, or to lock the 2 x 1 twill, may also be introduced. A section of the point-paper design of one such pattern is shown at Fig. 5. It will be noted that the drawing-in draft of such an arrangement is rather more elaborate but by no means difficult for a good drawing-in hand, and future warps can easily be twisted-in or tied by a warp-tying machine.

These fabrics may be greatly enriched by the introduction of rayon. A cotton-and-rayon twist yarn, bunched and woven as a cord, both warp and filling ways, will give a bright sparkle to the fabric. The use of 150 denier rayon as filling will give a silk-and-cotton dress goods of very rich appearance.

These goods are usually made in 32-inch and 36-inch widths. They should be woven about 4 inches wider in the reed space, and are best reeded at two ends per dent. The width from the loom should be about one inch wider than the desired finished width, as the goods will contract in the finishing process. These goods will take the usual high calender finish given to ginghams, and are well adapted to mills having dobbies of 16 to 20 harness capacity. They will be found a valuable addition of fancies to the usual styles now being manufactured by the average gingham mill.

A British Angle on American Mills

Last summer three interesting young Englishmen—Prof. W. E. Morton, H. C. Greg and Mr. Gell—visited this country and inspected a number of mills in both New England and the South. Returning to England, two of the party reported to the Textile Institute some of their observations while in this country. Because their reports constitute an interesting summary of these visitors' impressions of American mill practice, we believe COTTON's readers would like to see themselves as others see them. Therefore, these reports, as they appeared in the October number of *The Journal of the Textile Institute*, are reprinted below:

"In planning out our effort for today," said Professor Morton, "Mr. Greg and I decided that the best thing would be to divide the proceedings into two sections, in the first of which I should deal with the technical details of interest and that he would follow on with points of more general industrial organization. Obviously, in five weeks' touring one can pick up quite a considerable number of extremely interesting facts, but it is only the more important of these that I shall now be able to touch upon.

"Commencing wih the first operations of the spinning mills, the most notable feature was the difference in opening machinery compared with what we have in this country; not in the actual machines themselves but in the quantity. The Americans have nothing like the huge combinations of opening machinery one normally sees in spinning mills in this country. They are not very fond of upstroke beaters. They have down-stroke beaters and a scutcher and laphead, and then only one finishing scutcher. Their mixing is done by the stack method for what they consider to be medium counts and for what we consider to be fairly low counts, 35s and 40s. They have their mixing bins in separate buildings from the blowing room, and the material is conveyed by pneumatic trunks. By that means, they avoid having to pay rather high insurance premiums. The reason for the small equipment in opening may possibly be found in the type of cotton used. We expected when he went there to find the same kind of cotton one uses in this country. We asked, 'What is this cotton?' They said, 'That is Arkansas, Texas or Memphis cotton.' In some cases we saw local cotton. But it never seemed to be the same as the 'Arkansas', 'Texas', or 'Memphis' cotton that we use in this ecuntry. The difference is possibly rather hard to describe, but it has a rather harsher, harder, and more wiry 'feel', and I should imagine it would be a much more easily cleaned cotton, which may account for the reduction possible in opening and cleaning apparatus. The Crighton opener was not much in favor, but we understand it is rather coming to the front.

"Also, we saw horizontal cleaners something like those used in the early days of cleaning machine development. Apparently, they were rather afraid to have splitting laps in the carding, because we saw in every case the cards were fitted with a device for avoiding this, which overcame their difficulties. The only other point of interest in the opening and blowing was the supply of air to the fans for the scutchers. Normally, they have to put a great deal of humidity into their atmosphere, and it costs them a good deal to do it, so they cannot afford in the more up-to-date mills to have this expensive humidified air drawn through

the fans and out into the dust towers. In the case of two mills we found they have special ducts for drawing dust up from the scutchers and out through the fans again. In that way, they avoided withdrawing air from a mill which had been expensively humidified.

"Generally speaking, the carding was good, light, and relatively slow, but the stripping devices were the Saco-Lowell type of stripping, which, by turning a handle, can be turned over either to the cylinder or the doffer. There is no dust thrown out into the room from the stripping processes; it is all drawn away by suction. On the whole, we do not consider it is a very effective method of stripping, though it has an advantage over the Cook system in that the waste is better for selling to the waste dealer. In regard to the draw frames, one very rarely observed more than two heads to the draw frames. They seem to run on the system there of cutting down the processes as much as possible, consistent with obtaining good work. I know many people think it will ruin work to cut out either a speed frame or a drawing frame, but for their purposes there must be something in it because they are eminently careful in investigating problems, in which respect they are very much more systematic than, I think, we are in this country. One point was raised by a mill engineer, I think in Greenville. He advocated the use of five ends up for drawings instead of six in order to get a better selvage. I do not know how it would apply in this country, but apparently it would have a use under their conditions. Combing we found extensively used for what we call medium counts, even as low as 30s, especially if used as hosiery yarns, although in one mill they admitted it was probably not as effective as a good carded yarn.

"They have very little mule spinning as compared with ring spinning, and, on inquiry, we found that the reasons are two-fold. First, there is the difficulty in getting really skilled spinners, and secondly, those that they had had strong unions and were causing them trouble. They will apparently sooner put up with spinning reasonably high counts on ring frames than have bother with the unions. The next thing, as I think most people know, is the saddle weighting for all top rollers of the spinning frames. Only in one mill that we saw had they middle top rollers. They are very chary of high drafts, and this particular mill was anxious to go as far as they possibly could with the existing roller arrangement. They were in the middle of their investigation, and I do not know how it worked out. Ordinarily the drafts we saw were fairly high —six to ten.

"The frames are nearly always band-driven which they find pays them as they get surer work. They admit it takes rather more power but it has the advantage of surer working in starting in the early morning. We found that the warp yarns were nearly always weft built; that is to say, they had not a straight build on their bobbins. They said this gave easier readying, and there is less likelihood of the unskilled operative pulling the bobbin to pieces, while they get more on the package. I cannot believe that, because if you have the threads crossing over, as one has to have in a weft build, it is inevitable that the package must be softer. They say they get less breakages. They were using large bobbins, up to 8 or 9 inches, bigger than we have in this country at any rate. Before leaving the spinning frames one cannot help mentioning the Saco-Lowell spinning frame. We saw one of these. The gearing is at the opposite end to the drive. The main shaft runs through the tin roller, and the gearing is covered in by doors which can easily be opened; not heavy cast-iron plates which have to be lifted out without much room to do so. The gears are all helical cut, and they consider they get steadier and more regular running with them.

"Turning to the sizing, we observed that a very light size is generally used; in no case did we find more than 10 per cent and it is usually about 5 per cent to 7 per-cent. Where they were winding on for a multi-colored warp they wound on through a reed to facilitate drawing in. In their sizing rooms the lack of steam and water was very noticeable. Usually they had huge copper hoods for drawing-off the steam, and carefully designed ducts in the floors for water. On the whole, the rooms were much cleaner than I have seen them elsewhere.

"The dyeing is rather interesting. We observed in one mill the complete spinning of dyed stock; that is to say, the material is brought in in the bale, opened, and cleaned with a small amount of opening machinery, and then dyed straight away in a huge cylinder. It is then dried, and spun in the dyed form in their various stock colors. By that means, they are able to get a very level color, and, as far as weft is concerned, they can cut out one of the preparation processes in winding. We asked if they used oil for making the stuff work rather better but they said 'No.' Apparently they had tried it and found it did not do any better than mere water. They have a system of spray humidifiers spraying water on the cotton in the hopper feeder. The next thing about dyeing is the use of Franklin dyed yarn for weft. They wind the yarn on to packages, and have it dyed in that form, and then pirn it and use it directly on the weft. The levelling of the dyeing is not good, and it will not do for large quantities of color, but for pin stripes and narrow stripes the mill people find it quite satisfactory and rather cheaper. In wefts we found a prevalence of chain dyeing followed by pirning on quilling frames, that is, multiple-spindle winding frames.

"In the weaving room, except for drop-box looms, dobbies, and jacquards all looms were automatics. We saw two-color automatics for weaving ordinary two-colored ginghams, and even in the exceptions to the automatics we never saw an over-pick loom. They were all under-pick, warp-stop motions, even on the non-automatic looms. For what they consider low counts, and below them, they have steel heddles as a rule, and for finer counts the ordinary cotton heald predominated. Another thing in connection with looms appears to be a movement in the South towards the use of a deeper reed, deeper dents, so that they are stronger and less liable to be bent, and, of course, thus form cracks in the cloth. Finishing and making-up are all done in the same mill. Perhaps I should have mentioned before that in every case we saw the whole of the processes from raw cotton to the finished fabric ready for sale carried out either by one mill or by a group of mills working in conjunction.

"I will now turn to more general things and deal with the lay-out. First of all, there is the large amount of space available for temporary storage and for rapid internal transport. The importance of this was stressed many times by the managers, and it was evident in every department, and, in particular, the slasher and sizing rooms where they

have big gangways and plenty of room for moving things around. They have, in the up-to-date mills, automatic conveyers, and make as much use as possible of gravity feed; that is to say, they start the raw material on the top floor and work downwards. The material is put into suitables boxes, it is carried along to the end of the room along rollers, and then shoots down a spiral shoot on to the next floor ready for the next process. For moving warps to the sizing room, I think I am correct in saying in every case they had overhead monorails for taking the materials away, and not trucks on the floor.

"The next point is the lay-out of the machines in the rooms. Generally speaking, instead of having the rows of machinery down the length of the room as we usually find in this country, they have them the other way, across, with shorter and rather less diameter shafts than we have; that is to say, when they use overhead shafting at all. I should say in most cases the machines are individually driven, even the opening machinery and cards, and so on. Then they take very great care in the planning of their lighting systems. In nearly all cases they have the RLM reflector. You can go into the rooms at night without experiencing any uncomfortable sensation due to glare. In one or two machine works or shops we observed the use of mercury-arc lamps. They have a very good light, two or three feet long, and you can look at them without getting blinded, relatively speaking. Labor-saving devices are adopted practically everywhere. They endeavor to cut out human effort in all details. They avoid having a man whose job it is to do nothing else but push things about on the floor.

"In one mill we saw a 'Barber-Colman' bobbin winder and high-speed warper. The bobbin winder does all the piecing up. All the operative has to do is to bring along the spare bobbins and put them in the frame and the machine 'does the rest' at a remarkably high speed. The high-speed warper runs at a speed of 500 yards per minute or a little short of 20 miles an hour and makes an extraordinary good warp, a 31,000 yards of 29s complete, and, allowing for short stoppages, run in 80 minutes. Then we found there is a general use of weavers' knotters in order to save time. There is no hand knotting. There is no kissing of the shuttles. All shuttles have self-threading eyes, and cast-iron eyes are favored more than the brass ones. There is an extensive use of compressed air for cleaning opening machinery, with nozzle pressure of 40 to 60 pounds per square inch. Admittedly, they make a lot of dust in doing it but it does not settle back on the machines. They will go around with the compressed air nozzle for so long, and then sweep away the stuff on the floor. In that connection, there is a very interesting cleaning device used for ring frames; i. e., a blower—a small electric fan—traveling on a monorail over all the frames in one room. It consists of two arms down which air is propelled on either side of the frame. It simply moves along the frame blowing dust down. You might say that that stirs up a current of air and makes the dust fly, but it has the advantage that it does not allow the dust to collect, and you are not likely to have slubs and that kind of thing in the spinning, while the dust always collects on the floors.

"I would like to mention one or two points concerning technical education. It is evident that America relies almost entirely on its technical development for keeping its place in competition, not only as between the North and South states, but with other countries. Consequently you find the mill men in America have a very much greater interest in the work of their technical schools. The specialization of the operatives' job makes it such that they cannot draw on that class of people for their overlookers because they do not get sufficiently extended experience, consequently they rely on the technical school to turn out overlookers. They admittedly have to go through some sort of experience. They do not come straight from the school to take the job. The mill superintendents and the executive class rise of course from the overlooker class. Also, the people who are determined to go straight into executive positions attend the technical schools very regularly. Technical education in textile matters is supported wholeheartedly. The Massachusetts Institute of Technology wanted to raise five million dollars for extensions to buildings, and they had four million dollars subscribed provided that they could raise another million dollars in six months. They did it in three months, and they got the five million dollars.

Another point might be worth mentioning: that is the overlookers there apparently take much greater care in the training of new operatives than one finds to be the case in this country; consequently the operations are carried out uniformly throughout the mill and not left entirely to the ingenuity of the operative himself.

"Finally, the interchange of ideas is very free, and much freedom in allowing other men to come around their mills is permitted. That applies particularly in the South. Their attitude is this—you can get just as much out of the other man if he goes around your mill as he gets out of you, and it always helps you to discuss your problems with him, and you learn more by going around seeing other people's mills than you do in any other way. At the end of the trip a man asked me if we had had any difficulty in getting around the mills. I assured him that we had not and that we were shown everything, and that in many cases we were told things which were distinctly in confidence but they trusted us. He said, 'Mr. Morton, when you get back to your country you might tell your people that; because I tried to get around a lot of mills in your country and I did not succeed in a single case.'"

The other speaker was Mr. Greg, who said, "I should like to sketch the methods of production in America, as far as the personnel and their domestic difficulties are concerned. It is perhaps particularly interesting to look at this problem today because in America there are two distinct sources of production. You have the northern mills, the New England mills around Boston, some of which have been in existence for upwards of 50 years, and the southern mills, which extend practically throughout the cotton-growing belt in Texas, Oklahoma, Georgia, and North and South Carolina. The southern mills have certain advantages as far as labor is concerned. In most cases their hours of employment are not controlled by any state laws, whereas in the North they have their own laws, which would roughly correspond to city and urban district council by-laws in this country, as opposed to Federal laws or what we term 'laws of the land.' There are no Federal laws covering hours of labor in America in the textile industry.

"The North is now beginning to feel competition from the South where the conditions are rather easier as far

as labor is concerned. They have been faced with the problem we are facing at present of the tailing-off of markets and of difficulty in securing business. In one or two cases we heard it mentioned that during the war the capacity of the country to produce textiles had increased out of all proportion to necessity; the capacity of the country to absorb the goods being now much reduced. The people are really out to get business, and they have said, 'The business is there if we can get it. If our competitors can get it we can get it, and it is up to the best man to get the business, and we are going to be the best men.'

"I will take one particular instance of a mill which they told us would have closed down in a couple of months if it was run on the lines it was two or three years ago. They were literally desperate. Their method of tackling the situation was to get scientists to study their scheme of production. The scientists realized to begin with that the essential thing was to get the work to run well. They realized that there are certain operations such as creeling, doffing and warp-changing that are discontinuous since each involves periodic replacement of bobbins, beams, etc. They realized also that if they could stop end breakages their whole scheme would go through more smoothly. The first point they dealt with was the humidity. They proved conclusively, as it had been proved in this country, of course, that cotton spins best under certain conditions of moisture and certain conditions of moisture are more pleasant to work under. In their climate they cannot guarantee humidity at all, and they go in very extensively for humidification and pay great attention to it. In most cases it is done on systems like the 'Carrier' system, whereby they have all the windows shielded. They keep the workrooms under slightly greater pressure than atmospheric pressure, and they push 'doctored' air in; 'doctored' to the right temperature and humidity. The air works out through the windows and doors and liftways, and so on. Roughly, I think their figures are about 62 per cent relative humidity for spinning and 82 per cent relative humidity for weaving.

"The next point they considered was how best to apportion their labor. I would like to take a spinning frame as an example, because from that we may get their idea which we can then apply to cards and other machinery. The most important thing is the actual piecing up of an end; the most difficult operation to perform. They, therefore, took the number of frames they had, after they had satisfied themselves the work was running well. They discovered how many breakages there were per day, and how long it took a particular individual to piece up a particular end. They found out how many ends per day an individual could piece up. They then worked out how many frames would give that individual just that number of ends to piece up. They realized it was a waste of time having that individual dusting, seeing to broken bands and tapes, and creeling, and that it was a less-skilled job which could be done by someone who was paid less wages. They found that all the subsidiary operations like creeling, oiling and banding could be mapped out. Therefore, we get the extraordinary position of one spinner minding up to 24 ring frames, but we must realize that he or she only pieces up ends and does not do the whole operation.

"Another way in which they have been able to economize is by grouping their mills together in big federations with a central clearing house for the receipt of orders, so that the various orders can go to the mills most fitted for their production. This enables individual mills to keep to very few counts of yarn and to plan out their production between their opening, cards, drawing frames, combs, down to ring frames and looms, so there was no bunching of roving in one place and no lack of intermediate bobbins in another place. In one intermediate frame the bobbins in a creel were dressed like a regiment of soldiers. At one end the bobbins were full, half way down part full, and at the other end empty. The creelers knew exactly at any minute of the day which particular frame they should be creeling and which particular frame would be next to creel. They were there with their barrels, and took the empty ones out and put full ones in. All frames had special doffers for the job—intermediate, jack frames, and spinning frames. All the organization, of course, is based fundamentally on piece rates of wages. The spinner was paid on the production of the 24 frames minded, the doffers were based on the 20 or 30 frames they doffed, and creelers were on exactly the same basis. In every case where piece rates have been established the work has been split up so that the operative can produce more than before piece rates were established, and the operative has been given a very material benefit upon increased production. For instance, by the splitting up of labor one spinner, instead of minding two or three frames, doing creeling, piecing and everything, would turn out very much greater weight of yarn on 24 frames. She did not get the full advantage of the production of 24 frames as if she had creeled and cleaned them but she did get a very material advantage. This brings about a very curious point of view. When they start piece rates, first of all, they have to establish a basis of average earnings for a spinner. They then base the piece rate so that the spinners may get 10 per cent or 20 per cent more wages than on a day rate if they do a stated and reasonable amount of work. Whereas the day rate was 60 shillings a week, they are now earning 80 shillings a week. Any further piece rates will probably have to be based on the 80 shillings and they will probably get 120 shillings. What will happen after two or three generations of that sort of thing having occured I do not know, but that is one of their problems.

"The present situation in America is interesting in most cases where automatic looms have been started, and where this entirely new method of splitting up work is concerned. There have been strikes, the workpeople saying that the mill owners are trying to get the better of them, and that the conditions meant starvation for them. A strike usually lasts from one month up to nine or ten months. In America if they have a strike they let it go on. They believe that after a time the strike will be over and the workpeople will come back on the owners' terms. But the mill managements are now going in more and more for the policy of educating their workpeople and of taking them into their confidence. They are finding it a tremendous advantage to do so. The managements are only too glad to have a quiet talk over the table in the evening with their workpeople while they all smoke their pipes. They explain their difficulties, how their production is too costly, and point out the mutual benefit of adopting a new system. The workpeople, nowadays, instead of being suspicious, appreciate the point of view of the management. They appreciate that the management are not altering the

scheme of things purely for their own benefit, but that there is a very material benefit also to the workpeople. They are giving the management their whole-hearted support in consequence.

"In the Northern States the workpeople are of many races, comprising practically every nationality. You can go into some mills and see notices posted up in from four to ten different languages. There is not the same solidarity of labor by any manner of means that there is in this country. If one mill goes on strike the mill next to it has not the least compunction in taking in their workpeople or doing all their trade. They look upon the situation in this way—Well, these people are more stupid than we believe ourselves to be. We treat our workpeople well. They will stand by us. If they are unlucky, and cannot go on without a strike, and it is any benefit to us, we shall take the benefit.

"Another point about the labor situation is the extraordinary fluidity of labor. If a man has been a cabinet maker, and he finds that from some cause or other cabinet making work is not available, he will turn his hand to something else. He may go for a short time to a technical school during the daytime, and he will keep himself by taking a night watchman's job or working an elevator during the night, which seems to be the stock job for anyone who gets the sack. Then he goes to a mill. He will go through the hands of the overlooker, who will go to great pains to teach him the proper way to do things. If they can make him do things they will keep him; if they cannot then they have not the least compunction in dismissing him. Their method of determining a man to be what he claims to be is to see him at it. If there is a blockage through one operative being slow, they will go to considerable pains to investigate the case and to see if the work is right, if the frames are most convenient for the height of the worker, or if the light is wrong. Then if they are satisfied that they cannot increase the production of the operative through mechanical means they resort to dismissal. Owing to the relative scarcity of labor anyone who is sacked from one job can get another job without difficulty if they have really the will to work.

"Another point to which they pay great attention is advertising. They like to produce what is most suitable to them, and they plan out their mills to produce it easily and very cheaply. They go to great pains in advertising their products in order to get buyers to say the stuff you are making is just what I have been looking for.

"It has already been mentioned that a mill likes to do all its blowing, spinning, dyeing, weaving, bleaching, and finishing under one roof. That enables the management to secure a balanced working and to retain the profits from the intermediate processes. It enables the spinner to appreciate the weavers' difficulties with their yarns, and the spinner is able to rectify any faults and make the weavers' work easier. The finisher gives advice to the spinner. The whole thing is very much quicker in its cycle. If you have the whole thing under one roof you can push the spinning and weaving through quickly and get on to the finishing, whereas if it is split up the finisher may have a lot of work in from somewhere else and there is a stoppage. They have recently adopted a system of selling houses by means of which they are enabled to get in direct touch with the customer, and thus enable the manufacturer practically to have his own finger on the market's pulse. That is almost as big a development as any that they are going in for.

"The conditions in the South both in respect of results or methods of production differ greatly from those in the New England mills. There are no mill towns in the South. There are no Stockports or Boltons there. When people build a mill they also build a town for their operatives. Not only do they build the houses that the operatives live in but they build a school, a church, and very likely a technical college; there is nothing in the village except the mill and the operatives. The mill runs its own baseball team, its own cinema, and they rent their houses approximately at a rate of one shilling per week per room. Therefore, they have a pretty good control over their workpeople. The workpeople cannot move into another town or into another house because it is all controlled by the management and there they have to stay. The management are complete despots but they are most philanthropic. In every case that we saw the mill villages were clean, the houses were in good condition, the operatives were happy and contented, and were being looked after by the management as well, and probably better than they could have looked after themselves. In the mills the scheme of production is following fairly rapidly that of the New England mills; in fact, there is a great tendency for the New England mill owners to build a mill in the South and overcome the difficulties of mixed labor that they have in the North. We were told that we would see negroes and children working in the southern mills, but that is a big mistake. A white man will not associate with a negro at all in the South, and the control of child labor, not by any statutes, I think, but by mutual consent, is such that there are no young persons employed at all. Their production costs are considerably less in the South owing to the simpler life the operatives lead. They do not, of course, earn such high wages, because they have not increased their efficiency by piece rates and splitting up of production to the extent the North has done, but they are a considerable source of competition to the North.

"In conclusion, I wish to endorse what Professor Morton has said. The kind way in which we were received almost made us blush. You had practically only to turn up on a doorstep and they would greet you, invite you in and put you up for the night. The people there are always having conventions, and they go to great pains to attend them all, and they discuss their views with great freedom. As soon as a man has a new idea he goes and tells his neighbors about it at a convention, while he himself receives perhaps a dozen new ideas from other speakers, so that the exchange is a profitable one from his point of view."

J. H. BAGWELL has joined the sales forces of the Arabol Manufacturing Company. He has been overseer of weaving at the Belmont Fabric Company, Belmont, N. C.

J. A. MANDEVILLE has been made president of the Mandeville Mills, Carrollton, Ga., succeeding his father, the late L. C. Mandeville.

THOMAS F. KILDUFF has been made superintendent of the Avalon Knitwear Company, Anniston, Ala.

JOHN W. TRIGG has been made general overseer of slashing and weaving at the Massachusetts Cotton Mills, Lindale, Ga. He has been connected with the Baldwin plant of the Aragon-Baldwin Mills, Chester, S .C.

Raw Materials First

By LUTHER H. HODGES and HARRIET L. HERRING

The article below is one of a series which has to do with the fundamentals of business, or, more properly known as Industrial Economics. These articles are being published from month to month. Each one is a unit in itself, although forming an integral part of the entire series.

Practical mill men like practical material and these articles are designed to meet the needs of textile operating executives who are interested in knowing more about the laws governing business and industry. The entire series has already been used by a large cotton mill organization in the South in its educational work, and this organization found the material to be very practical and effective.

Each article lends itself to discussion by groups of mill men, as well as being helpful and interesting reading. Naturally the articles are brief and in attempting to cover this large field, only the most important points have been considered.

Our Extractive Industries.

We have already discussed the growth and development of various Economic Systems from the earliest times down to our modern industrial world. These earlier economic systems had mainly to do with farming, stock raising, etc. From these primitive beginnings our systems were traced to the Industrial Revolution and then to the modern factory. Before we begin a detailed study of the modern order, it would be well for us to consider the relation between the industrial plant and the products of nature; that is, the raw materials. Mr. Roberts says "All industry is organized for the fundamental purpose of extracting raw materials and utilizing the forces of nature, and shaping and using them to serve mankind. In this process the materials are used up and the forces dissipated. As population grows, the rate of strain on the supply of natural resources increases all the faster."

The economist views nature as a storehouse of potential wealth and all industries connected with the production or development of that wealth are called "extractive" industries. Examples of the extractive industries are farming, cattle raising, mining, lumbering, fishing, etc. On these primary industries all else depends. Their resources determine the costs and living conditions; upon the supply of these resources depend all manufacturing industries. We, therefore, want to seriously consider these primary industries and our dependence on them. Fundamentally, all of the products upon which society is dependent come from the earth; our food, fuel and raw materials spring either directly or indirectly from this source.

World's Population Dependent.

The world's population is dependent upon the supply of natural resources. At many times already in the world's history, it has been felt that the pressure of population was too great for the resources of nature. Back in 1798 an English preacher, Thomas R. Malthus, published an essay on the subject of the world's population in its relation to the food supply. Briefly, he stated that the population of the world tended to increase faster than the means of living. In other words, Malthus argued that people were coming into the world faster than food was being provided. The natural result of a situation like this would be the annihilation of the race or at least the killing off of the number necessary to agree with the food provided. This theory was widely discussed and contested but was accepted by a great number of people. Another great Englishman of that day, Lord Macaulay, must have had a similar theory to the one proposed by Malthus, for in a heated debate regarding the success of democratic institutions in America he said, "As for America, I appeal to the 20th Century." Evidently, the great Macaulay felt that by the year 1927 the population of America would have increased beyond the supply of subsistence for the population.

Conditions Were Bad.

At the time mentioned, the conditions were pretty bad in England. The Industrial Revolution described in a previous article was just getting under headway and with its many new inventions and radical changes was causing utter confusion among many of the people. The skilled artisans who had previously been making a good living found themselves thrown out of work by the various new machines. In order to get close to the coal mines and water power the industries shifted their center and the population suffered. Through the comparative large scale production of the "factories," goods could be produced more cheaply than under the old system and the craftsmen and artisans had to suffer losses in their own material returns of wages and the investments in their tools and machines.

Even with a gradual re-adjustment and improvement among the people, it was felt that the population was increasing more rapidly than the production of food, clothing and other necessities. The people had not learned to conquer nature and make her yield greater bounties by more intensive cultivation of farm lands. They had not learned how to get the most out of their mines. But conditions began to change and there were two main things that served to help solve this anxious problem at that time. First of all, the development and use of the steam engine for keeping the mines free from water and in driving the textile machinery, furnished cheaper fuel and enabled the factories to get larger production. The factories were able to multiply man labor several times by the power machinery and give the population great production of goods at less cost than before. Second, the development of the steamboat and locomotive opened up to better advantages other countries, notably America. This served to re-distribute the population and even up the supply of land.

America's Service.

The natural resources of Ameriea attracted a great number of the people of Europe after transportation was made lower. It is doubtless true that the opening up of America's vast resources saved Europe from possible disaster. At this time, Europe's population had grown from 175 millions to 450 millions in the past one hundred years, and American population had increased in the same period from 10 to 110 millions. These great increases have come about because of the fact that living standards have been raised, we have become more intelligent producers and our mechanical improvements growing out of the Industrial Revolution have increased the production of goods for the people of the whole world. But, in the minds of many people, this situation is now changing.

The opening up of the lands of America for a time satisfied the wants of the surplus population of Europe. We had free lands and cheap lands and we had natural resources in abundance. Due to the increasing supply of goods and to the continued development of machine efficiency, prices of goods declined and the standards of living were raised. The last twenty years, however, have shown a change. Prices have risen steadily and the improvements in conditions of living have not been in keeping with the rapid progress of manufacturing and inventions. Farm machinery has made for great efficiency and cheaper production on the farm, but prices on farm products have gone up. Manufacturing becomes more efficient, but manufactured products rise in costs. Where is the trouble?

Our exports of foodstuffs to Europe have begun to fall off, and Europe is having to look to other nations. It is because our natural resources are being used up. All of our cheap and free lands are gone. With the gradual use of the lands further to the west the price on all lands has risen, land values have climbed until the cost of production on land becomes very high. There are yet lands which can be irrigated and re-claimed, but the high costs make these things impractical. The returns do not seem to justify the outlay. Too much expenditure which the returns do not justify, illustrates what is known as the Law of Diminishing Returns.

Our Raw Materials.

What about our raw materials? Just as our land is becoming more costly to develop, so are the prices on our raw materials going up. The supply of raw materials has not increased, and as we have grown in population, we have used greater amounts of our raw materials. Our coal supply is diminishing rapidly, our best fields will not last more than another century, while the total supply will doubtless be exhausted in another 2,000 years. We are consuming coal at the rate of thirty million tons a year. The same condition applies to oil. Many authorities say that our increased use of refined oil, or gasoline for motor cars threatens the supply of oil in the near future. In the last 10 years our gasoline consumption has increased over 700 per cent. The oil question has become international in scope. It is likely to figure largely in future wars in the Near East and Mexico.

We are all more or less familiar with the condition of our forests. We are using four times as much timber as we are growing. We have numerous industries dependent on our forest supplies and a policy of conservatism seems absolutely necessary. Another important raw material is iron. It is difficult to think of a product in which iron does not enter. It is the source of practically all tools. Without it, we could not have our transportation systems. Buildings of all kinds depend upon iron. Our present production is, perhaps, 25,000,000 tons a year and at this rate the available supply is rapidly decreasing. Additional supplies of iron ore can be mined only at higher costs than now prevail.

New Source of Power.

We must learn more efficient ways to produce. We can improve our methods by inventions and mechanical progress and by personal application. Man is learning better every day how to harness the forces of nature. Water power is being developed and electric power is being continually put to new uses. With the creation and development of the super-power system we can get more efficient results at less cost: A program to burn the coal near the mines to generate power which can be transferred on electric wires, bids fair to reduce power costs, cut out freight charges and relieve the railroads for other work.

The greatest sources of power, the sun, the winds and the tides, have not been touched. New sources of food supply may be found. Henry Ford says the cow is unnecessary, that milk can be produced in a laboratory just as easily as it can be gotten from a cow. Already substitutes are being found for meats and when it is considered that only 3½ per cent of the grain energy is recovered for human consumption in beef, this becomes an important consideration.

Utilization of By-Products.

But better than the other things mentioned would be the saving of things we now produce. We need to cut down our wasteful methods; we need to be more efficient in our production and more economical in our consumption. That is the surest way of making our resources ample for the needs of our population. Further, we need to utilize by-products and see that nothing goes to waste. There has been great improvement along this line, for on coke alone, in 1918 the value of by-products was $45,000,000. There are just as good illustrations in the textile industry. It was once thought that the seed from cotton were valueless, and they were thrown away or burned up. They are now a valuable part of the cotton crop, for not only are the seed good as feed for stock, but the cotton oil from the seed is a valuable by-product. After the cotton reaches the manufacturing stage, some of the waste is re-worked and utilized. Even the lint that is napped from the blanket as it is being finished, is bleached and sold for batting, etc.

This serves to give us a hurried glance at this important feature of our study. All production, all industry, as we are accustomed to think of it, is dependent upon the extractive or primary industries. The whole fabric of our business and industrial world is dependent on nature and nature's resources. We, therefore, should think seriously about our resources and what the probabilities are for the future. Further study of manufacturing, production, costs, etc., is of necessity, linked up with the primary industries.

Questions.

1. Did the industrial Revolution have a good or bad effect—or both? Explain.
2. Have there been any notable changes in textile machinery and processes since the Industrial Revolution?
3. As a laborer in 1775 in England, what would have been your attitude toward the machines which were invented.
4. Name some raw materials on which our textile plants are absolutely dependent.
5. What happens to the workers who lose out when labor saving machinery is introduced in a factory?

National Sulfur Brown R is a new addition to the sulphur brown line of the National Aniline & Chemical Co., Inc., 40 Rector St., New York City. It is recommended by the company for use as a self-color or in combination for ginghams, shirtings, etc., and is said to be of excellent solubility and good fastness to both washing and light, especially when after-treated with copper.

Dyeing Cotton Yarn with Direct Colors

BY WILLIAM B. NANSON.

Like all goods which are to be dyed in the yarn or skein form it is essential, to insure even dyeings, that the yarn should be thoroughly boiled out and in some cases half bleached. Before boiling, the yarn should be laced together and made into chains of about 120 pounds each either by tying them together end to end or by linking them together. They are then run over winches like strands of cloth into the kier and through the various operations of preparation. Less frequently the skeins are boiled in 10-pound bundles in which case they are moved by hand. This boiling may be conducted in either high or low pressure kiers and the time used in boiling is from five to ten hours according to quality and requirements.

During the boiling out the skeins should be covered with liquor and with boarding to keep the yarn from contact with the air. After boiling the liquor is run off and the yarn well washed off in the kier, first in hot water which is run away, then in cold. If the goods are very low and dirty two per cent of soda ash and one per cent of caustic soda, figured on the weight of the goods, may be added to the boiling liquor.

If the goods are for pink or for fancy light shades the goods may then be lightly soured and washed again before removing the hanks to the dye tanks.

In this latter case, and if boiled only, the washing must be very thorough because if any alkali or if any acid remains it may be detrimental to some colors and cause uneven dyeing. The yarn should then be extracted and colored as soon as possible after extracting, because it will not do to have it dry in places as it may occasion blotches in dyeing.

When dyeing light delicate shades, they must not be crowded on the sticks in the dye tub; give them lots of room in dyeing, as they are harder to handle than dark colors.

With regard to the washing, this may be done either by hand or by machine, of which there are two or three on the market. The same may be said regarding the wringing, squeezing and hydroextracting, only do not let the goods lie.

The dyeing of cotton yarn is comparatively simple and is practiced much more on this account than the dyeing of cops, cheeses and similar goods.

Vats of a rectangular shape, provided with false bottoms that are perforated, and of such a depth that the yarn will not touch the bottom when hanging freely from the stick are largely used. These vats are generally made of pitch pine and are held together by bolts. The steam pipe, which is perforated, is made to enter at one end of the vat behind a wooden partition. In some vats a closed coil is used so as to avoid the dilution of the dye liquor. This is likely to occur owing to the condensation of the steam. The skeins of yarn are placed on sticks so that they are suspended above and in the dye liquor. In this manner five or ten bundles of yarn are placed on and into the vat at a time until sufficient space is left at the end for turning them. The yarn should then be given an odd number of turns, as five, seven, or nine, as in this way the immersion in the liquor is the same; if it is given an even number one end of the yarn skein will have an extra dip and is therefore likely to be darker than the other.

After dyeing the skeins are then rinsed, if necessary, and wrung, hydroextracted, and dried. In large dyehouses doing many pounds of the same color, the yarns may be dyed and washed by machine, of which the market furnishes plenty, but it is not economical unless there are large quantities of the same color. Quite a number of machines have been suggested for dyeing and bleaching yarn in the skein, but comparatively few are used owing to the initial expense and the time and labor lost in cleaning the machine each time the color is changed.

Though drying by air gives us, in most instances, the best color, it takes up a great deal of room. Therefore there are many machines in the market for drying yarn by hot air in a continuous and quick way that have been installed at various plants, but where we have plenty of room, drying cool and by air gives us the best work and the goods are enough heavier so that it pays all the expenses of drying and hanging to say nothing about the better color.

Direct Colors.

A class of colors that are not used to the extent that they should be are the direct colors, aftertreated with chrome, bluestone and acetic acid. The bluestone renders them much faster to light, while the effect of the chrome is to produce shades of extreme fastness to soaping and washing. Moreover, certain of these colors when treated in this manner give results that will stand cross-dyeing. These colors when aftertreated are very level and uniform. Even when direct dyeings appear streaky, the working in the finishing bath will strip off the excess of color, and produce very even results. Nearly all of the color concerns have these colors, (though I refer more especially to the American colors), especially browns, and all show in their shade cards and pattern books, but they hardly appear to realize what excellent products they are. Probably one of the reasons that dyers do not take to them as they ought is owing to the fact that the shade changes a great deal during the aftertreatment; but a little experimenting and practice will obviate this difficulty, so that one can tell just what the final result will be, and it is no more than the dyer of top chromed colors on worsted yarns and pieces has to contend with every day.

A light drab or a tan can be made in this manner, as fast to light or washing as with the sulphur dyes, and they will be much better as regards level dyeing, and the cost will be only one half of the latter.

When dyeing with the direct or substantive dyes it is always better to dye some of the shades on bleached or half bleached cotton, namely, if the cotton is to be dyed into light shades. If, however, the cotton is to be dyed into dark and heavy shades, then it is better if dyed on the unbleached material. In the latter case it is always as well to first boil the cotton yarns in the kiers with soda ash or with water alone before dyeing.

Monopole soap, Turkey-red oil, or Marseilles soap are often added to the dye bath for the purpose of more readily wetting out the cotton.

The direct or substantive colors are, as a rule, dyed

with: 2½ per cent of soap and 10 per cent of sodium phosphate, or 2½ per cent of soap and 20 per cent of kitchen salt, or 2½ per cent of soap and 5 per cent soda and 10 per cent kitchen salt, or 5 per cent soda ash and 20 per cent kitchen salt, or 20 per cent kitchen salt, which can, in most cases, be replaced by Glauber's salt. In fact, the writer thinks the latter is better.

If half silk is dyed with soap and sodium phosphate, the silk is left nearly colorless, but if 20 per cent kitchen salt is added to the bath, both fibers are dyed alike.

The dyestuffs should be dissolved in soft waters, or, better still, in condensed water. Hard water should be boiled up with some soda to make it soft before the dyestuff is added. The practice of adding the dyestuff direct to the bath is not to be recommended. If it is done, however, the soda should be added first, then the dyestuff, and finally the kitchen salt or Glauber's.

All the substantive dyestuffs except the following, may be dyed from an alkaline bath: Cotton yellows, Bayer and Co., Clayton Aniline Co. Benzamine pure blue. Brilliant sky blue, Bayer and Co. Diamineral blue, Casella. Diphenyl blue, Geigy. Alkali greens. Alkali black green. Diamine green, Casella. Oxamine green, British alzarine. Polyphenyl green, Geigy.

The neutral salts such as kitchen salt and Glauber salt are added, not as mordants as generally understood, but for the purpose of accelerating the dyeing, but the addition of soda or Turkey red oil, or soap or sodium phosphate has a retarding influence, and therefore has a tendency to produce more level and uniform dyeings.

It is customary to dye at a boil for about an hour. If the shade is light it may be dyed at a lower temperature than this, say at about 120 degrees to 140 degrees F., but the shade is always faster if dyed at a boil. It must be mentioned at this point that there is no mordant for these colors (direct) and that therefore the light shades (pink, etc.) can be dyed alone with soda or Turkey red oil or some soap or other retarder so that the color will go on slow and level. In dyeing heavy shades an accelerator is beneficial such as Glauber's salts, etc. It is a good idea to dye at a boil for about three-fourths of an hour and then shut the steam off and run for about one-half hour longer in a cooling down bath. Also it must be borne in mind that the dye bath should be provided with a closed steam coil whenever heavy shades are to be dyed.

In many cases it is of importance that the concentration of the dye bath should be noted, as its exhaustion of the dyestuff depends largely upon this. It may be generally said that the shade is deeper with the same amount of dyestuff on a "short" bath than a long one. In some instances, however, it has been found that a large volume of liquor is best when dyeing direct blacks. It exhausts better. For light shades a dilute bath is best.

If common salt be used containing appreciable quantities of calcium or magnesium salts it is well to add the necessary amount of soda ash to the salt when dissolving. This is to precipitate and settle the bath so as to give it a clean solution. The amount of salt or Glauber's salt added to the bath varies considerably, but if the dyebath is to be used continuously great care must be taken to adjust the addition in such a manner that the dyestuff is not precipitated, (salted out). A little may be added the first time and then less and less each time until there is sufficient in the bath without any addition. In this way baths may be used for months without any danger.

Salt or Glauber's salt should never be added to the bath in the case of delicate or light shades. The addition of from 3 to 10 per cent of sodium phosphate and 1 to 2 per cent of Turkey-red oil will always give the best results, if a more strongly alkaline bath is required one or two per cent of soda ash may be added. Monopole soap is now frequently employed in place of Turkey-red oil or Marseilles soap and 5 or 10 per cent of Glauber's salt, in the case of light shades, may be used in place of sodium phosphate, but the results are not as satisfactory as those of the latter. Medium shades should be dyed with the addition of two per cent soda ash and 10 per cent calcined Glauber's salt or a corresponding amount of crystallized Glauber salt.

For heavy shades two to five per cent of soda ash and 20 to 30 per cent of calcined Glauber's salt, or 35 to 40 per cent of kitchen salt should be added. Benzo indigo blue and Benzo copper blue B and 2B are best dyed with 10 per cent of soda ash without any addition. The brilliant sky blues should be dyed without soda and some of the greens but the necessary quantity of Glaubers' salt must be added to the bath, also 2 per cent of acetic or formic acid, i. e., the bath must not be alkaline.

The specific gravity of the salt in the dyebath must be tried with the glass at 60 degrees F. For light shades it must be about 2 degrees Tw., and for dark shades it must not be more than 4½ degrees to 6 degrees Tw.

Some of the direct cotton dyestuffs such as Cotton Red S, Rosophine, Saint-Dennis Red must be dyed from a strongly alkaline bath. For instance for 100 pounds of cotton yarn, the required quantity of Cotton Red S is mixed with about twice its weight of caustic soda (76 degrees Tw.) A little hot water is added so as to make the whole into a uniform paste, which is then poured into the boiling bath, with the addition of about 140 pounds of common salt. A short bath should be used (about 1:15) and the yarn should be worked for ¾ to an hour at a boil. Wring and rinse slightly. For subsequent dyeings about 2/3 to ¾ of the dyestuff used in the first bath and a quantity of common salt, corresponding to that which has been removed should be added.

For 100 pounds cotton yarn: Dissolve 2 pounds 13 ounces of Saint-Dennis Red in 4½ pints of caustic soda lye (77 degrees Tw.) and two gallons of water. Heat until completely dissolved and then add 6¼ gallons of water. This solution is then added to the dyebath, which is prepared as follows: 207 gallons of water, 520 pounds common salt and 31 pounds of soda ash. A wooden vessel provided with a closed copper steam coil should be used. Enter the yarn at 75 degrees to 85 degrees F., raise the temperature to the boiling point in not less than 20 minutes and dye 30 to 45 minutes at the boil. After dyeing, wring and pass through a one per cent solution of sulphuric acid, (try formic acid) rinse and dry. For future lots of cotton take the same dyestuff and make up the bath with the same proportions of salt and soda as before.

The Pontamine colors are direct dyes and are fit illustrations of goods made in this country. All are good for dyeing rayon and many will be benefited by after treatment by chrome, bluestone, copper, etc. It is best to see the makers on each point. Do not be afraid to ask them, for it is part of their business.

Pontamine Fast Yellow N. N. This is dyed on cotton

like other level dyeing direct colors. The required amount of dyestuff is dissolved and strained into the dyebath which should contain 10 to 20 pounds of common salt (100 pounds of cotton yarn). The material is entered below the boil and kept at that temperature for ¾ of an hour and then dyed for 15 minutes more in a cooling bath. Rayon is dyed between 140 degrees and 160 degrees F. Pure silk is dyed by the usual methods.

Union goods are dyed in a neutral Glauber's salt bath. This yellow dyes a bright greenish yellow of excellent fastness to chlorine, light and washing. For a direct color it is exceptionally fast to washing and water and is therefore quite suitable to ginghams, threads, etc.

When applied from a boiling Glauber's salt bath on half wool or half silk the cotton is dyed much heavier than the wool or silk. The tone of shades produced, however, is the same in both fibers, and solid shades may be produced by shading the animal fibers with suitable acid dyes.

In a weakly alkaline bath Pontamine Fast Yellow N N may be used as a speck dye, wool and silk fibers remaining white. Pontamine Fast Red 8 B L is dyed like all direct colors and is good for combination colors on cotton. It is a red of a bluish shade. It is also good for artificial silk or union goods. Solid shades may be obtained from a boiling Glauber's salt bath. If an alkaline bath is used, the animal fibers are left white. This property makes it useful for speck dyeing.

Pontamine Fast Black L N is a direct color and is dyed as such, if alone. The requisite dyestuff is thoroughly dissolved and added to the bath through a fine sieve. To the bath are then added according to shade (slate or black) one half to two pounds of soda ash and 10 to 35 pounds of salt. The dyeing is carried on at the boil for 45 minutes. Then shut off the steam and dye for 15 minutes in the cooling bath. This may be made faster by chrome, etc., as before mentioned, but will not answer, I think, for speck dyes. These last four colors given are good for various combinations. Cotton goods may be dyed in the usual direct way and these substantive colors made faster by mercerizing or diazotising or developing or they may be coupled with diazotized paranitraniline, etc., or they may be after-treated by various metallic salts, or they may be topped with various basic dyestuffs all of which will be treated of in another paper.

Warp Sizing

BY PAUL SEYDEL.

Recapitulation.

One of the essentials for good weaving is a dependable way of regulating the amount of moisture on the warp.

The proper preservative must be permanent, that is one that will not evaporate either through heat or time or other conditions the fabric may be subjected to.

It is of considerable importance to protect the size system with asbestos covering to reduce radiation of heat to a minimum and maintain the temperature of the size without dilution by excessive use of live steam.

Recooked size after it has jellied is necessarily inferior, at it will not produce a continuous and elastic film. Size should be used as soon as possible after it is made. It is preferable to make several small batches to be used rapidly rather than only a few to last several hours and it is poor practice to keep size over night, especially if it cannot be kept very close to boiling temperature. If size is kept over night, it should be kept as hot as possible and never be allowed to cool enough to jell.

It is excellent practice to provide the delivery pipe into the size box with a filter bag or box to avoid the presence of lumps, etc., in the size box.

Size kettles should be small and well provided with efficient stirring devices. Pressure kettles are not advisable, too much heat reduces the viscosity of the starch .

Proper precautions to insure uniform quality of ingredients should be used. Starch should be weighed not in pails but in one weighing, using a suitable receptical.

The practice in use to prepare a batch of size is to first put in water, stir, add starch and other ingredients and turn on steam gradually.

This was discussed in detail in COTTON for January, 1926.

Ingredients Used in Sizing.

Wheat flour is a good material now practically replaced by starch because starch is easier to use and needs less preparation. Wheat starch was manufactured by the ancients before the Christian era. The indiscriminate use of thin boiling starch for warp sizing is inadvisable. When used, a sizing compound with the proper viscosity and agglutinant properties must replace the qualities deficient in thin boiling starch.

Raw starches from different sources can be identified through the use of a microscope as they all have a distinctive granular appearance.

Granulose and cellulose in the proportion of 95 to 5 are the components of starch besides water. Granulose colors iodine blue and cellulose yellow.

Corn starch is mainly used because it is economical for best results and fine work. Other starches or mixtures of starches are also advocated. Potato starch is widely used for colored and fine work due to its unusual transparency and fine feel. Wheat, rice, sago and tapioca all are valuable starches.

The average time required to obtain the best and most consistent results for thick boiling starch in mixtures of medium concentration, stirred moderately and not boiled too vigorously and under normal atmospheric pressure is one hour to one hour and a half. Thin boiling starch requires comparatively less stirring and boiling.

Many natural gums have been used for warp sizing. They have gradually been replaced by starch gums. Starch gums can be obtained by the proper chemical treatment of the different starches and the proper blending of these products to advantageously replace the natural gums such as Gum Tragacanth, Irish Moss, Gum Arabic, etc., etc., of purer quality and greater value at less cost per unit of efficiency.

The different chemicals used may produce gums of every description having qualities varying from complete solubility to absolute insolubility; from excellent adhesiveness to great agglutinance; from extreme brittleness to remarkable elasticity, even to a substance which may be termed artificial rubber. Some of these gums give iodine

reaction, others do not and many have excellent applications in sizing and finishing. The uninitiated analyist is often puzzled by the great variety of gums so produced by experts and no one can identify all of them with anything approximating accuracy.

Tallow, the principal fat used in warp sizing is not an ideal lubricant; although it has fair oilness, it lacks in viscosity having a tendency to loosen the short fibers. The addition of a viscous oil and some glycerides such as so called vegetable waxes is essential to increase its body and viscosity at the temperature of the weave room. The word wax is a very indefinite term applied to a number of fatty substances resembling bees wax more or less and they are widely different in nature and value as sizing materials. One of the important functions of gums in warp sizing is the formation of permanent fat emulsions. Such emulsions of neutral fats are preferable to alkaline soaps in sizing, due to incompatibility of alkalies with most useful sizing ingredients. Numerous fats and oils are available, none is ideal by itself; a blending of several of them is preferable to obtain best lubricating and softening properties.

Deliquescents adding strength and suppleness are essential ingredients of any size formula. Also a permanent and powerful antiseptic for the proper protection of the warp against mildew. Inorganic salts are much more efficient than organic compounds as preservatives and deliquescents.

Among weighing materials, china clay is the principal ingredient used in warp sizing. It should be very fine and absolutely free from abrasive matter. Weighters are used not only to add weight to the cloth but to give it a certain desired feel, to fill in, to make the cloth impervious to light, etc. A list of the principal weighting materials, their advantages and objections was given in the June, 1926, number of COTTON.

The problem of analyzing a complex mixture of organic compounds is no child's play. The component parts of a mixture of a number of fats and of a number of gums of similar nature are often impossible to determine.

The only real practical value of the analysis of a size mixture is to determine whether the proportion of each group such as fats, gums, mineral matter remains constant in subsequent shipments. As to the money value of such a mixture, nothing but an actual test on a practical scale can determine that. No responsible sizing manufacturer would use ingredients which might prove objectionable in bleaching and further processing. It is essential that the sizing manufacturer be an expert chemist, with a thorough understanding of the compatibilities and practical value of the ingredients he uses.

The quality of a warp may be greatly enhanced by the proper treatment of it when sized; this depends as much on the materials used as on the way the materials are used. The replacement of flour by starch and faster weaving increased the demand for an efficient size. The maximum efficiency at the minimum cost is best.

It is important to be able to trace the defects of a warp to differentiate between lubricating oil stains, mildew and rust spots; to learn to avoid them as well as to correct them. Not only the manufacture and materials used is responsible for defective warps, but careless treatment is much to blame.

Size should not be diluted with cold water, the less dilution the better, but whenever it is necessary to do so, it is important to guard against any sudden cooling of the size mass. Water should be added slowly with constant stirring and keeping the temperature as near boiling as possible. On proper installation of a slasher room depends in a great measure the quality of the warp for weaving purposes.

When using copper cylinder driers, they should be free from leaks and there should be no water on the floor so that the atmosphere be not so damp as to require a higher temperature than necessary for drying. The lower the temperature the better the warp, for this reason air chambers with large volume of moderately warm air produce a stronger and more elastic warp than an overheated cylinder which tends to bake the warp and make it brittle. The proper tension of the warp on the slasher is a matter of considerable importance.

EDITOR'S NOTE—This "recapitulation" concludes the series of twelve articles on "Warp Sizing" by Mr. Seydel.

A book on the subject of "Employment Statistics for the United States", has been published by the Russell Sage Foundation, 130 East 22nd St., New York City. There is at present much inaccuracy and duplication and lack of similarity in the compilation and publication of this information, and this book provides a clear, non-technical manual on the subject. It is a product of the committee on governmental labor statistics of the American Statistical Association, comprising federal and state bureaus, research bureaus and business and labor organization representatives. The plan presented calls for monthly pay-roll statistics obtained from selected employers in all important data; and prompt publication of the data for cities, states, and the nation. Textile manufacturers, making monthly reports on employment and earnings to state or federal bureaus, will find this of especial interest. The price is $2.50 per copy.

The annual meeting of the branch office managers and sales force of Stein, Hall and Company, Inc., was held at the home office, 285 Madison Ave., New York City, when a review of 1926 showed that the total sales were the largest in the company's history. In making plans for the new year, emphasis was laid upon service, the company having improved the service department substantially, notably through the installation of the control and research laboratory devoted to scientific research in connection with uses of tapioca flour, starches, dextrines, etc.

Lowinson's comparative cotton goods chart for 1926 was issued in January, and is available upon application to Louis Lowinson & Co., 72 Leonard St., New York City. This publication, which has been distributed for a great many years, is of considerable moment at this time as the record of prices on grey goods for the past year, which it contains, shows the varying influences which prevailed upon prices due to the surprises supplied by the various Government reports on cotton during the year, etc.

J. T. TIDWELL has become general superintendent of the Judson Mills, Greenville, S. C.

CLARENCE HATLEY has been promoted to night overseer of spinning at the Wennonah Mills, Lexington, N. C., succeeding J. C. Reese, resigned.

What the Southern Mills are Doing

The first month of the new year was featured with a number of announcements of new additions and enlargements among southern textile mills, and some few new enterprises were included among the items garnered from reports of activity in the industry.

In Georgia, the Athens Manufacturing Company, at Athens, announced plans for and began work upon a plant addition to provide for balancing the equipment and increasing capacity. This company recently increased its capital stock from $200,000 to $450,000 to provide for this expansion work. Oscar D. Grimes is vice-president and general manager.

A program of enlargement and improvement is planned by the Calhoun Cotton Mills, Calhoun, Ga. The tentative plans call for an increase in the capital stock to $200,000, and the increasing of the spindleage to 7,500 spindles.

Definite report is heard that The Trion Company, Trion, Ga., is to enlarge the plant facilities considerably either by the addition of a new mill or the increasing of the present buildings to provide for additional machinery.

A 20,000-spindle addition, with complementary looms, will be built at the Gainesville Cotton Mills, Gainesville, Ga., it is announced. Lockwood, Greene & Company, Atlanta, are the engineers. The increase will bring the mill's spindleage up to approximately 60,000 spindles with complementary weaving equipment.

Contract for the new mill of the Dwight Manufacturing Company at Alabama City, Ala., has been let to the Fiske-Carter Construction Company of Greenville. The plant will be two-story, 132x154 feet, of brick and concrete construction. It will be used to house equipment shipped from the Essex Cotton Mills at Newburyport Mass.

Tallassee Mills, Tallassee, Ala., have added 124 Draper Model E looms, and the Montala Manufacturing Co., Montgomery, Ala., have installed 24 additional Model E looms.

A mill addition, 110x120 feet, is planned by the American Net and Twine Co., Blue Mountain, near Anniston, Ala., which recently completed a $25,000 power plant. The addition will cost approximately $250,000, and it is understood that work will begin next month.

Woodruff Cotton Mills, Woodruff, S. C. have let contract to Bailey Builders' Supply Co., of Union, for the erection of 75 new cottages in the village, and R. A. Self has been given contract to remove 64 existing houses to provide space for the new structures.

Brandon Mills, Greenville, S. C. will build 100 homes in the village for employees, the contract having been let to Cox and Hodgens.

Arcadia Mills, Arcadia, S. C., it is understood, plan to install 5,000 additional spindles.

Improvement work on a warehouse has been started by the Williamston Mills, Williamston, S. C.

Offices of the Globe Manufacturing Company, Gaffney, S. C., have been transferred to Clover, where C. N. Alexander, who has been elected treasurer ,is located. Mr. Alexander is also treasurer and general manager of the Blacksburg Spinning Company and the Bowling Green Spinning Mill. It is also announced that the Globe mill will be converted from a cloth mill into a sale yarn spinning plant, the yarns to be used for hosiery and underwear manufacturing purposes. The yarns will be of the same grade as those manufactured at Bowling Green and Blacksburg, but of a different range of numbers.

San Marcos Cotton Mills, San Marcos, Texas, have been granted permission to sell stock for the erection of a cotton mill. P. M. Keller is in charge of the work.

Extension plans are under way at the Halifax Cotton Mills, South Boston, Va., the addition to include a bleachery. The present mill makes damasks with 12,000 spindles and 300 looms as equipment. The extension work will bring the company to a $1,000,000 proposition the report states.

L. H. Gilmer Company, who are erecting a mill as Shreveport, La., have let contract to Saco-Lowell Shops for the machinery. It is understood that 5,200 spindles and complimentary machinery for weaving will be installed.

Contract for repairing and improving the mill buildings has been awarded by the Monticello Cotton Mills, Monticello, Ark., to the Griffin-Hodges Company, of Atlanta, Lockwood, Greene & Co., Atlanta are the engineers.

According to report late in December, Titus, Blatter & Co., had placed Lockwood, Greene & Co., engineers, in charge of the erection of an $80,000 upholstery goods mill at Charlottesville, Va.

Waxahachie Cotton Mills, Waxahachie, Texas have been reorganized as the Waxahachie Cotton Mills Co., with J. Perry Burrus as president and Randolph Caldwell as secretary.

C. R. Miller, of Dallas, Texas, and associates, have placed in operation a weaving mill at Nuevo Laredo, Mexico, which will utilize yarns from the Miller plants in Texas.

The Acworth Blanket Mills, Parsons, W. Va. a new branch of the Acworth Cotton Mills, Acworth, Ga., have just completed additions and improvements. The main addition consists of a one-story brick and concrete structure, 80x36 feet. A water tank of 200,000 gallons capacity has been added to the equipment. The new addition is divided into two rooms, in one of which will be installed dyeing equipment, and in the other the picker equipment.

Mooresville Cotton Mills, Mooresville, N. C., will add several hundred towel looms, it is reported.

Saluda Towel Mills, Saluda, N. C., are equipped with sixty looms, and have started operations. The capital stock is $100,000. G. R. Little is president and Walter Thompson treasurer.

Considerable new machinery will be installed at the Union Cotton Mills, Maiden, N. C., to replace existing equipment.

Alamanee Novelty Mills, Burlington, N. C., a new corporation, is building a one-story mill, with monitor. Looms and dyeing and finishing machinery for making combed yarn and rayon novelties will be installed. A village is also included in the project, in which M. B. Smith, W. K. Holt, Eugene Holt, A. Glenn Holt and J. Spencer Love are interested. The product will be sold by the Dickson & Valentine department of Frederick Vietor & Achelis, New York, according to the report.

Fifteen bedspread looms have been installed at the Ellenboro Cotton Mills, Ellenboro, N. C. These mills are financed by W. H. Belk and others.

Plans are being made to enlarge the Park Yarn Mills, at Kings Mountain, N. C., from 5,000 spindles on coarse carded yarns to 12,000 spindles on 60s combed yarn. New machinery will be installed.

Erwin Cotton Mills Company, West Durham, N. C., has let contract for the installation of plumbing fixtures in operatives' homes, according to announcements.

The Farish Company have been appointed selling agents for the Henrietta Mills, of Caroleen, N. C., and the Edna Cotton Mills, of Reidsville, N. C.

Southern Friction Fabric Company, manufacturers of diaphragm cloth, is building a plant at Charlotte. Several Greenville, S. C., men are interested, including F. D. Murdock, of the Southern Weaving Company, F. C. Bentley, who will be in charge, and others. The Charlotte plant will have an initial equipment of six looms, with a weekly capacity of 10,000 pounds.

Ten new dwellings are being erected in the village of the Lola Manufacturing Co., Stanley, N. C.

The installation of new machinery in the experimental laboratory of the North Carolina State Textile School, West Raleigh, N. C., is nearing completion. Two speeders and one drawing frame from the Whiten Machine Works, and one H. & B. card with the latest improvements, have been set up ready for operation. The last lot of picking machinery, consisting of a breaker picker, a C O B machine and condenser, is being erected, and two Fales & Jenks spinning frames are being installed. One of these frames is equipped with the Casablancas system of long draft spinning. The Saco-Lowell Shops are furnishing two speeders and a long-draft spinning frame.

An addition to contain 30,000 square feet of floor space is being built at the spinning mill of the Appalachian Mills Co., Knoxville, Tenn., in which additional machinery will be installed.

Piedmont Plush Mills, Greenville, S. C., are adding six Jacquard looms.

New England Mill Situation.

The severe shaking up that old New England mills have been undergoing was illustrated in the opening of flannels and cotton blankets for the new season of 1927. The flannel product of the Hamilton, Tremont & Suffolk, and Methuen mills in northern Massachusetts are off the market. The remaining mills making the goods were able to stand firmer for better prices and the opening of the new season has been influenced greatly by the fact that at least 30,000 cases of goods will not be made by concerns that have either been sold, or closed.

To meet the new and harder merchandising conditions that confront blanket mills, Amory, Browne & Co., selling agents for the Nashau Mfg. Co., have adopted an agency plan whereby they ship goods to jobbers and retain the ownership of them until they are sold, the jobbers acting as the agents of the selling house, under an agreed form of contract between them. The Pepperell Mfg. Co., selling organization, acting within the selling house of Bliss, Fabyan & Co., have taken over the selling of the napped goods products of the Massachusetts mills of Lowell, recently purchased by the Pepperell, and will dispose of them in conjunction with the sales of Pepperell sheets and other products.

Through closer cooperation with southern mills making flannel lines the New York selling agents have been able to bring about a show of price stabilization in flannel lines that has not been seen for a great many years. The opening prices showed reductions varying from 15 to 20 per cent below the prices of a year ago and they have been maintained. In past seasons, the new prices were hardly named before agents were cutting prices and seeking business wherever they could find it. In this way the buyers became disorganized until they were finally driven into the hand to mouth system of ordering, for self protection.

The revival of trade in New England mills reported a month ago has continued. The underlying cause is found in cheaper raw material. Other causes are at work, among them being the patent desire of operatives and people generally in mill communities to cease "nagging" mills in matters of taxes or other factors that have led to general demoralization.

The New Bedford fine goods mills are running nearly in full in fabric lines but some of the fine yarn mills there are idle as a consequence of changes in the tire fabric trades. The buying of broadcloths, and rayon mixtures has been large and converters are now beginning to sell finished goods more freely. Several mills there have adopted the practice of either consigning goods to converters in the finished state or making provisions for bearing some part of the finishing costs, thus indirectly aiding converters as selling agents for the distribution of the products, and for the sole purpose of securing advance business for the looms.

In Fall River, the second week of the year was reported to have seen the best business offered to mills that they have had in more than two years. The prices at which many odd cloths were sold were very low but they permitted some chance of profit and at the present time the mills there are operating to about 70 per cent capacity, which is the highest attained in more than a year.

In other sections, especially in northern New England improvement has been broader. Some of the Maine mills are now running to capacity for the first time in two years. The big Amoskeag Company is operating more than 10,000 looms full time for the first time since the strike of a few years ago. Several of the smaller New Hampshire mills are running full time and the big Nashua mills are receiving the best business they have booked for many long months. In Rhode Island, some of the mills are very busy and are more hopeful of the future than they have been for three years.

The large printers are very busy. The job finishing plants are making better headway, especially on printed goods but they are not averaging more than 65 per cent of capacity output as yet. Since the opening of the year business has been improving with them.

In some quarters more disposition is shown to adopt machinery improvements but the stage of radical changes in that direction has not yet approached a situation where it is safe to predict any large expenditures in the immediate future. The Neumkeag mills have completed the installation of the new automatic spoolers and warpers that have been attracting so much attention in manufacturing circles, similar in a way to similar improvements being inaugurated in some of the Cannon mills in North Carolina.

The usual attempt is being made to amend the 48 hour

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law in Massachusetts or repeal it so that the 54 hour law may be restored, but while very strong arguments are being presented there is little hope that any change will be made. In some cities, notably in those centers where mills are idle and where threats of removal or sale of machinery have been made, public bodies have come into the open in favor of making concessions that will prevent the removal of plants to the South. In this and other ways, it is apparent that New England is finally coming out of the long and unparalleled period of depression that has hobbled the cotton manufacturing business for several years.

Most of the attention of selling agents for mills is being given to the encouragement of new forms of merchandising, and particularly those forms that are the outgrowth of the cooperative movements within the textile industries as a whole. The National Association of Cotton Manufacturers has started a traveling style show on its way about the country for the purpose of increasing the use of cotton dress goods of various kinds. This show was opened at the envention of the National Wholesale Dry Goods Association held in New York, Jan. 18.

For two or three months there has been a revulsion of opinion in the manufacturing and merchandising world against the idea that mill products may be eventually distributed profitably outside of jobbing channels. Studies made by economists as well as the common experience of trained merchants have brought to the fore again the indispensability of the American jobber in balancing cotton mill production by making central warehouses for the steady and profitable distribution of goods to retailers at seasonable periods.

Syndicate buying, selling direct to retailers, selling constantly through chain stores and catalog houses, and enhancing sales through large appropriations for consumer advertising for which mills are being forced to pay, in many instances, do not seem now to offer all that is essential for manufacturers in meeting the new conditions of small inventories in retail hands and frequent buying direct or only when actual counter demand is on. The new studies have by no means reached a point where it is safe to say that many of the new practices that have crept into mill distribution will not remain in somewhat modified form.

Indeed, such a radical plan as that of establishing agencies among wholesalers for the distribution of trademarked lines is in a more or less experimental condition. The most that is hoped for at this time is that out of a greater degree of cooperation between jobbers and mills workable plans will be evolved that will insure the producer and the secondary distributor a reasonable degree of profit. The retailer has been able to protect himself better against the long declines in inventory values than either mills, agents, or jobbers have, and it is felt that a greater degree of cooperation among the factors in these trade channels is at hand. New England is leading the way in some respects but the Cotton Textile Institute spirit is spreading and the New York selling agencies are taking hold in ways thought impossible less than a year ago.

The strength of cotton has helped considerably in restoring confidence among cotton goods buyers, and the low prices have continued to do their share toward spreading the idea that an end is near of continual declines in inventory values during the selling season. A month or two ago there was great anxiety expressed lest another period of overproduction was at hand. It is now felt that while it would be a great deal better for all in the industry if normal day production prevailed instead of day and night running in both eastern and southern mills wherever orders encourage them, the industry as a whole would be much better off.

This is not preventing a wider recognition of the fact that with lower prices going into effect in retail channels, as they will very noticeably in the next two to three months, there will be a larger consumption of cotton goods than there was last year. The figures recently issued by the New York Textile Merchants showed that stocks were materially reduced last year in cotton goods manufacturing and distributing channels and with low cotton a certainty for some time to come it is thought that this tendency to absorb production as it comes along has a better chance of being maintained than it had at this period a year ago.

The present sentiment in New England as reflected in mill machinery channels is that the time is not ripe quite yet to undertake the renovation of many properties that are not going to be allowed to leave New England. That such a renovation and requirement is in embryo is no longer denied in some circles where machinery improvements are recognized as having been more radical than is commonly appreciated. The large sales of gray cloths in the first two weeks in January has given great encouragement in this section but it is not lessening the growth of the belief that the salvation of the industry in the section lies along re-planning mills to produce fancy and fine goods, and novelty lines generally.

Cotton Comment.

H. AND B. BEER.

New Orleans, January 15th, 1927,

For the same reasons mentioned in our previous review, viz: belief that the government has overestimated this season's crop by 500,000 to 1,000,000 bales by predicting a yield of 18,618,000 bales, the price being below the cost of production, and large exports from the United States, which features have been augmented meanwhile by general improvement in the demand for cotton goods at home and abroad, the cotton market shows a further recovery in values of about $5 per bale compared with one month ago, making an advance compared with the low of the season of about $8.50 per bale.

Much of the buying has been influenced by the continuance of large exports from the United States, which, to yesterday, were 1,097,000 in excess of shipments to corresponding date last year—5,907,000 bales against 4,810,000.

But much of the cotton is not going to foreign mills direct, instead they are adding to European stocks, which, including the afloat, show an increase of 1,044,000 bales over last year, or about the same increase as noted in exports.

In other words world's spinners takings of American cotton thus far this season have been disappointing since they are only 146,000 larger than to even date last season, when takings for the whole season were 15,090,000 bales. Consequently takings so far are not in keeping with early private estimates as to this season's consumption being

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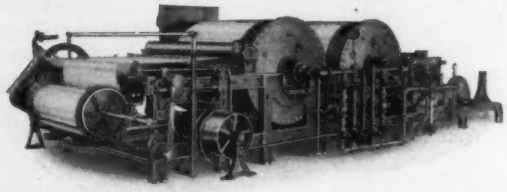

with Saco-Lowell's Rayon Slasher

The Dover Mills of North Carolina, who have recently placed with us a repeat order for these Slashers, write us:

"We are sure that there is no limit to the number of ends that you can run on your new Rayon Slasher. We have run so far a range from 176 to 1440 WITHOUT THE SLIGHTEST TROUBLE."

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16,500,000 bales, as takings for the season, at the moment, are running on a basis of only 15,236,000 for the whole season, although it is likely they will make a better showing during the last half of the season, in which event the season's consumption may approximate 16,000,000 bales vs. 15,105,000 last season.

On the foregoing basis, and on the basis of the government's crop estimate, plus linters and last year's carry-over, etc., the following would be about the carry-over at the close of July 31st, next:

American cotton Bales	This season	Last season
Carry-over August 1st.	5,362,000	2,991,000
Indicated crop, lint	18,618,000	16,104,000
Linters, etc., est.	1,682,000	1,432,000
Season's indicated supply	25,662,000	20,527,000
Season's consumption, if	16,000,000	15,165,000
Indicated carry-over July 31st.	9,662,000	5,362,000

Based on the government's crop estimate, linters, etc., and last year's carry-over in the interior, there remains in the interior about 8,070,000 bales vs. 5,251,000 at this time last year, as the amount marketed to date is 13,524,000 bales against 12,499,000 marketed to even date last season. The world's visible supply of American cotton yesterday was 6,833,000 bales compared with 4,984,000 one year ago.

It is evident, therefore, that the world's available yesterday, of American cotton, exclusive of mill stocks, was about 4,668,000 larger than at this time last year, as noted by the following deductions:

American cotton	Bales This Year	Last Year
Unmarketed, about	8,070,000	5,251,000
World's visible supply	6,833,000	4,984,000
Indicated world's available, exclusive of mill stocks, about	14,903,000	10,235,000

Whether the indicated world's available is as large as the above figures would indicate depends on the correctness of the government's yield estimate, which, as we have stated before, many people are of the opinion is much too large. It will likely require the final ginning results to decide this important question. Late advices, however, are to effect that there remains considerable cotton still in the fields in the southwest.

As to preparations for the next cotton crop, little has been done so far in the way of farm work, such as plowing, etc., but there is a good season in the ground, especially in Texas, as was the case last winter. The total average rainfall for Texas, October 1st. to December 31st., was 9.48 inches vs. 8.85 for same period last season and normal of 7.09.

The owners of Gardiner Hall, Jr. Company, manufacturers of cotton sewing thread, located at South Willington, Conn., have incorporated under the name of The Gardiner Hall, Jr. Company. At the director's meeting held after the incorporation, the following officers were elected: President, R. O. Hall; vice-president and secretary, R. H. Paige; treasurer and general manager, W. R. L. McBee, assistant treasurer, J. G. Service; directors, R. O. Hall, R. H. Paige, W. R. L. McBee, G. H. Hall and F. H. Smith.

Dyeing Chain Warps With Vat Colors.

BY C. B. EPHLAND.

I have been dyeing chain warps exclusively for the past 12 years, and find this process very hard to do successfully with some vat colors; while some others dye very evenly and without much trouble.

The Plaid Mills are using the best there is in fast colors and I have had varied experience with different dyes and have had my troubles, most of them I have overcome, some I have not. They have the fastest line of colors of any gingham and novelty mill in this country, all of which are fast; some faster than others, and if any faster colors are put on the market they will adopt them; so you can readily see that I have my troubles.

Dyeing vats and some other dyes on chain warps are so complicated, until sometimes I think I know nothing at all about it, and don't claim to know much—just beginning.

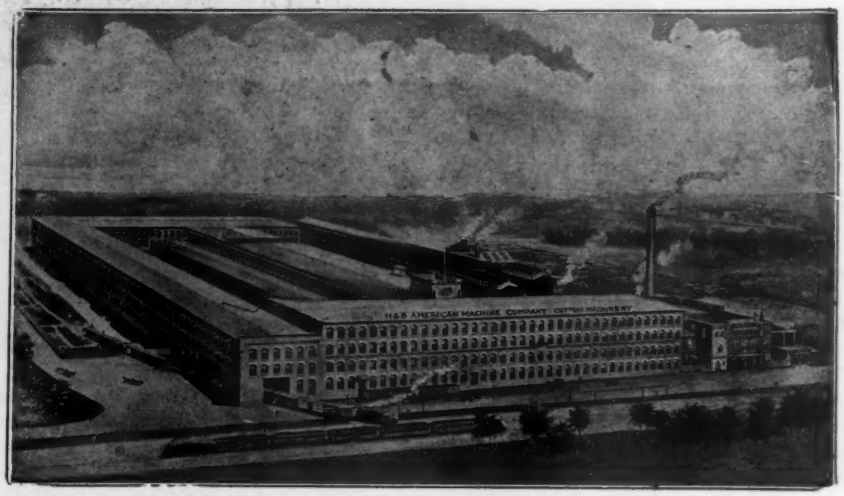
You know some vat colors are not as good as others, but mainly we have the best, and usually the better the dye is, the less trouble I have in applying it. One of my troubles is keeping a uniform shade from end to end. I am using a five compartment machine, giving two ends in dyeing most of the vats. This five compartment machine is all right for most vat colors, but there are some slow oxidizing colors that do not work well with two runs; these I give three. Some dyes (violets for illustration), will have a reddish cast on one end, and a bluish cast on the other. This has given me lots of trouble. I have tried different ways to overcome it. I have tried different ways of soaping, to some advantage; also different ways in the use of chemicals, but the best results I have obtained with violets are to use a little oil on the bluish end and leave off the oil on the other.

Some of the other vat dyes give me similar trouble. In mixing vat dyes, one of my greatest problems is to get a combination that will exhaust them. This, I believe, is the chain dyer's greatest difficulty, and my experience is that it pays to be careful in selecting dyes for combination. This will apply to all classes of dyes. The very best on the market does not work any too well in chain dyeing. I am sure the better class of vat dyes work better in combinations.

Another trouble I have with some dyes, is keeping them in solution throughout the run; say for two or three hours. Those of you who have never run chain warps may not understand this, but when you consider warps going in and out of the dye continually for three hours, you may not wonder that the dye goes out of solution. To get the right amount of hydro and caustic at all times is a problem I have never fully realized. Some days it seems to take more than others. I attribute it to the atmosphere. I may be wrong; I am not chemist enough to say, but am convinced that the water and air have much to do with successful dyeing with vats, as well as napthols. I have tried various ways of holding vats in solution as I said before, they will not work alike every day.

Another trouble I have had (I don't mean any reflection on any dye company, or its laboratory), is that laboratory dyeing will not work out often in chain dyeing. Dyes can be mixed in the laboratory and dyed successfully

COTTON MACHINERY



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there. At the same time I do not believe it can be done successfully on chain warps. You known in chain dyeing the yarn is not in the dye but a few seconds; while in the other processes it is in the dye from one-half to an hour, and the after treatments are the same way, which gives quite different results. We could not do without the laboratories and I appreciate the help from them; yet sometimes I think they should consider the practical application more before going to the mills and saying certain mixtures will give certain results. Some mills might expect their dyer to get the same results and many times they cannot do it. I am glad to say that the Plaid Mills know better, but we have had our trouble and expense finding it out.

Now don't misunderstand me, I am not knocking anybody, but just telling some of my troubles and this is a difficult one. This probably will not apply to any other process. I must say, I believe chain dyeing is one of the best ways in many instances to dye warps; regardless of Franklin Process, beam dyeing and raw stock. It will be a long time yet before it is eliminated; in fact, I believe it may be coming back stronger than ever. There are many advantages in chain dyeing, that you can not get any other way. Less crocking, brighter and cleaner shades, and I expect the most uniform way outside of raw stock dyeing.

[The foregoing remarks are extracted from a paper presented by Mr. Ephland before the Burlington (N. C.) meeting of the Southern Section of the American Association of Textile Chemists and Colorists. Mr. Ephland is colorist at the E. M. Holt Plaid Mills in Burlington. We repeat here the invitation to all readers interested in dyeing to comment upon this discussion or other phases of the process with which they are concerned. If any reader can relate a solution of any of the dyeing problems brought up by Mr. Ephland, we shall welcome his suggestions.—The Editors.]

H. N. Slater, president of S. Slater & Sons, Inc., of Webster, Mass., announces the appointment of Fred Butterfield & Co., Inc., of 361-363 Broadway, New York City, as national selling agents, to style and distribute the products of their clothiers' linings department. On January 1st, 1927, S. Slater & Sons discontinued the merchandising of wash fabrics and shirtings under their own name. They will expand their job finishing business for the converting trade through their own organization under the management of John P. Abbott, for many years with The United States Finishing Company and more recently with the Clark-Rice Corporation. James G. Clark will continue to care for the interests of such accounts as have formerly been handled by him.

W. P. WHITLEY, overseer of spinning at the Franklin Cotton Mills, Concord, has been transferred to Cannon Manufacturing Company mill No. 7, at Kannapolis, N. C.

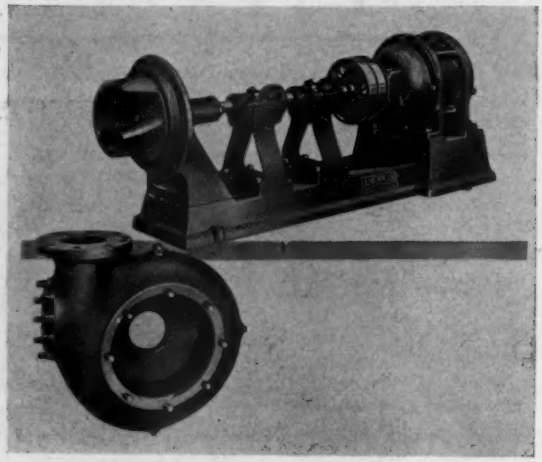
ROY N. LOTSPEICH, vice-president and treasurer of the Appalachian Mills Co., Knoxville, Tenn., has been elected president, succeeding J. T. Brownlee, and retains the office of treasurer. R. R. Spilman and Ira A. Watson have been made vice-presidents; T. L. Henry was re-elected secretary and A. E. Warren general superintendent.

J. H. WOOD is now assistant superintendent at the Capps Manufacturing Co., Toccoa, Ga.

New Non-Clogging Centrifugal Pump.

The American Well Works of Aurora, Illinois has just placed on the market their non-clogging centrifugal pump. The design of this pump is said to mark a new departure in construction and to obviate the necessity of screens and their expensive maintenance.

The single blade impeller in the pump is so designed

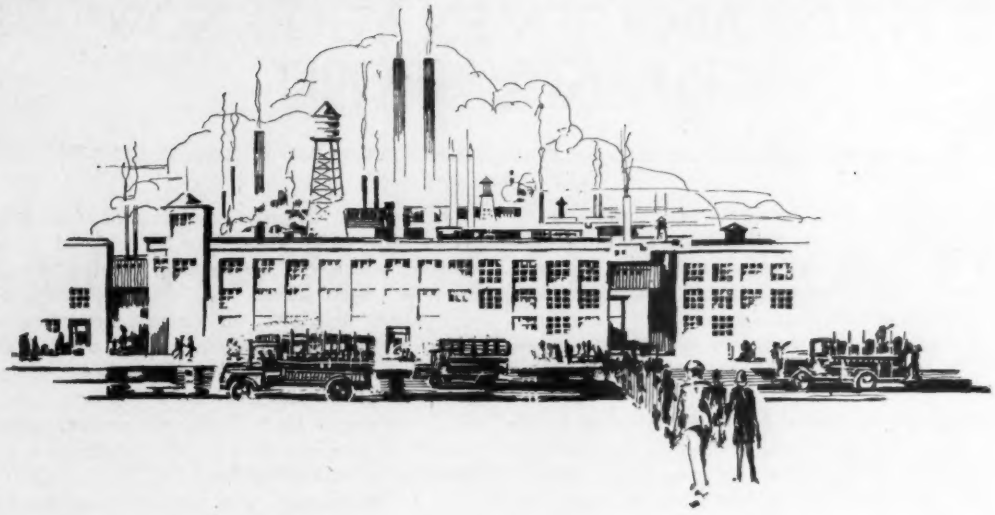


that the stream lines are not separated, it is pointed out, but so the stream of fluid is kept in one mass and carried through the pump without being subdivided. By compelling all the liquid and debris to be discharged through a single peripheral passage, there is avoided the possibility of different portions of a single piece of debris being swept into different outlet passages and thereby being hung up within the impeller. This precludes screening sewage or fluid containing other material before pumping.

Fluids containing stringy matter, mineral matter, animal matter, and vegetable matter, such as hair, string, waste, shavings, rags, mud, chips, sand, sludge, wire debris, slaughter house and fish market refuse, offal, fat, grease, weeds, straw, stable flushings, etc., can be handled successfully, it is claimed.

The E. H. Jacobs Manufacturing Co., of Danielson, Connecticut, manufacturers of leather and canvas textile loom equipment, opened a southern factory in the Bostick Industrial Building at 501 West Palmer Street, Charlotte, North Carolina, on January first. This company since 1869 have been the pioneers in developing canvas and leather loom equipment, and have been leaders in this specialized industry. The business was established by Edward H. Jacobs and his brother, Frederick A. Jacobs, and has continued to operate successfully for more than fifty years. Today it is under the active management of W. Irving Bullard, Frederick A. Jacobs and Joseph H. Chadbourne, Jr. Because of the wide use of their products, the establishment of a southern factory is in line with their policy to render maximum service to their customers.

Joseph H. Chadbourne, Jr., vice-president of the company, has removed to Charlotte, while Mr. Bullard and Mr. Jacobs will operate the plant in Danielson, Connecticut, to cover the eastern, western and export markets for their products.



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NOTES ABOUT MEN YOU KNOW OR KNOW ABOUT

W. D. ANDERSON, president of the Bibb Manufacturing Company, Macon, Ga., with plants also at Porterdale, Columbus, and Reynolds, Ga., has been given the additional duties of chairman of the board of directors, succeeding E. T. Comer, who has resigned.

W. D. ANDERSON, JR., has been elected second vice-president in charge of sales of the Bibb Manufacturing Company.

L. R. GILBERT, for several years superintendent of the Caraleigh Mills, Raleigh, N. C., has become treasurer and general manager of the Audrey Spinning Mills, Weldon, N. C. Mr. Gilbert is vice-president of the Southern Textile Association.

LEWIS B. DANIELS is superintendent of the Audrey Spinning Mills, at Weldon.

C. N. ALEXANDER, manager of the Bowling Green Spinning Mills, Bowling Green, S. C., and the Blacksburg Spinning Company, Blacksburg, S. C., has also been made treasurer and manager of the Globe Manufacturing Company, the offices of which are being moved to Clover, S. C.

C. K. TAYLOR is to be superintendent of the McComb, Miss., plant of the Roundtree Cotton Mills Corporation.

ROBERT W. ALLEN, vice-president of the Allen A Company, of Kenosha, Wis., has been named president, succeeding C. C. Allen, resigned.

CHARLES P. PULLIAM has been made vice-president and director of sales of the Everwear Hosiery Company, Milwaukee, Wis. He will have entire charge of the selling of the company's products, and plans the inauguration of a dealer merchandising service. Mr. Pulliam has for four years been associated with the Rollins Hosiery Mills, Des Moines, Iowa.

ROBERT F. HERRICK has resigned as president of the Saco-Lowell Shops, and D. F. Edwards succeeds him. Mr. Herrick retains his interest in the company and will remain on the board of directors. Mr. Edwards for twelve years was associated with the automotive industry in responsible executive positions. During most of this time he was in close working association with C. W. Nash, president of the Nash Motors Co. For several years he was vice-president and later president of the Wickwire Spencer Steel Co. During the war he was a major in the ordinance department, and later transferred to the general staff, purchase, storage and traffic division.

E. I. WENGER is now associated with J. W. Fraser, industrial specialties, with headquarters in the Commercial Building, Charlotte, N. C. Mr. Wenger is a graduate of McGill University, Montreal, Canada, and has had a wide experience in the industrial field.

ROBERT WALKER, vice-president of the Pickett Cotton Mills, High Point, N. C., has been made president, succeeding the late F. M. Pickett. J. Elwood Cox is first-vice-president and S. D. Sears is second vice-president.

J. M. SHORT, formerly superintendent of the Alta Vista Cotton Mills, Alta Vista, Va., has resigned to take a similar position with the spinning plant of Charles H. Bacon Co., Lenoir, Tenn.

PARKMAN D. HOWE, for the past two years assistant treasurer of the Merrimack Mfg. Co., Lowell, Mass., and formerly assistant treasurer of Saco-Lowell Shops, has become associated with Lawrence & Company. Mr. Howe, who is the son of H. S. Howe, who recently retired as a partner in Lawrence & Co., will be affiliated with the Boston office of the concern.

S. L. MCCRACKEN, who recently resigned as general superintendent of the Steele's Mills, Rockingham, N. C., has become southern representative for the Baltimore Belting Company, covering North and South Carolina and Virginia. His headquarters will be at Rockingham, N. C.

A. E. STALEY, JR., has been made general superintendent of the A. E. Staley Manufacturing Co., starch manufacturers, Decatur, Ill., succeeding the late G. E. Chamberlain. J. H. Galloway has been made superintendent. Mr. Galloway was assistant superintendent under Mr. Chamberlain.

HARRY BUCKLEY, who for nineteen years has been in charge of bleaching, dyeing and mercerizing at the Acadia Mills, Methuen, Mass., has resigned to accept a position with the Aberfoyle Mfg. Co., Chester, Pa. Austin Ainsworth succeeds him at the Acadia Mills. On the occasion of his departure from Methuen, Mr. Buckley was tendered a surprise farewell dinner, at which a solid gold Hamilton watch, knife and chain, suitably engraved, were presented to him by Agent William A. Pedler on behalf of his associates.

GEORGE H. BRIDGE, JR., has located in Charlotte, N. C., as southern representative for the American Supply Company, Providence, R. I., manufacturers of reeds, harness, belting and general mill supplies. Mr. Bridge is an experienced mill supply salesman, having had some twenty-five or thirty years experience in New England. He will cover North and South Carolina with occasional trips to Georgia and Alabama.

W. C. GIBSON has resigned as cloth room overseer at the Exposition Cotton Mills, Atlanta, Ga., to become associated with the Arabol Manufacturing Company as salesman.

V. H. CARR has been promoted to the superintendency of the Kinston Cotton Mills, Kinston, N. C., succeeding J. T. Phillips, who resigned to become superintendent of the Buck Creek Cotton Mills at Siluria, Ala. Mr. Carr has been overseer of spinning at Kinston.

J. W. EMORY has been made superintendent of the Knit-well Hosiery Company, Durham, N. C.

O. C. DEMPSEY is superintendent of the newly-organized Clarke Cotton Mills Company, Athens, Ga., which took over the Bowen-Crews Company.

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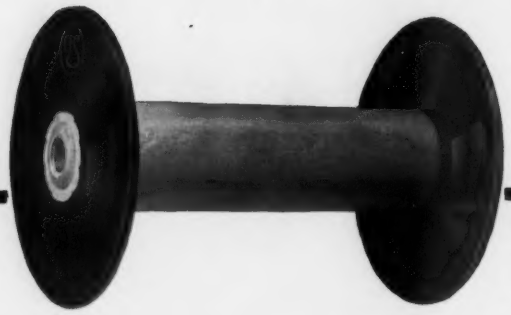

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Consider the advantages of using spools with heads that will not warp in regular mill usage, come off or apart, crack or sliver. U S Vulcanized Fibre Head Warper Spools are so guaranteed in construction and are further guaranteed to give long service and satisfaction. These advantages coupled with the U S guarantee make U S Vulcanized Fibre Head Warper Spools a good investment even for the mill which buys strictly on price.

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AN OLD TIMER SAYS

In working with zest and giving his best,
Just for the pleasure of the giving,
In the hope of helping his brothers along,
"Old-Timer" finds the sunshine of living

"Hello Jim! Where the dickens have you been so long? I haven't seen you since the last time."

"Well, to tell the truth, Old Timer, I have been checking up on our last visit through the mill" (Series of articles which started March, 1926.)

"Checking up! What do you mean, Jim?"

"Go on, you know how many times you have told me that 'no human being would keep on doing what he was told to do' without checking up on him. Therefore I have been going right back over those things we saw while making our inspection.

"First, to see if the men fully understood what I wanted done, and second, to find out whether any of them had improved on our ideas or not.

"You know, Old Timer, that when an overseer or superintendent tells his men to do a certain thing in a certain way, he should not be hard-headed enough to think that he has a corner on all the good ideas, but he should encourage those men to use their own brains and improve on the ideas he gives them."

"Now that's just fine Jim. I am certainly glad to see you are getting broad-minded enough to not only look at things that way, but that you are beginning to appreciate the cooperation your men give you.

"You know you can never tell what is going on inside of a human head by looking at it. You never know until a test comes.

"Just to illustrate, I was in conversation with my editor the other day and all at once he stopped talking and began to look very thoughtful—I sat back and waited for the great idea, which seemed to be forming in that head, to materialize and come out.

"Finally he broke the silence with something like this:

" 'Old Timer. I have been wanting to ask you something a long time; I have given the matter considerable thought, and to ease my mind I am going to put the pointed question to you.'

"Fire away, Mr. Editor, I can stand most anything. Let's have what's on your mind.

" 'Well I would like to know whether you sleep with your beard under the cover or on the outside.'

"None of your **?!* business."

"Cut out the comedy Old Timer and let's talk about our work."

"Yes, I know Jim, but that gives you an idea of what goes on inside of some editor's heads—sometimes.

"You know Jim, I have noticed all these scientific (and otherwise) reasons why the northern mills are in such a bad way, and some of them are very good, and no doubt true.

"Such things as unfair legislation regarding working hours, taxes, etc., but to my humble mind there is one point they have not realized, or if they have, they have not brought it out.

"That is the management inside the mill—the overseers and superintendents—have not cooperated with each other like the southern overseers and superintendents have.

"I well remember visiting some northern mills several years ago, and it was like getting into the Unitel States Mint to get into the mill, and when you did get in, they would not tell you how many looms a weaver was running or how many sides a spinner was on or anything else that they thought would be any worthwhile information.

"When the Southern Textile Association was organized with the avowed purpose of exchanging manufacturing ideas, I understood that many of them considered us a bunch of sap heads. But as I said before, you never can tell what is going on inside a human head by looking at it, and evidently they missed their guess that time"

"Say Old Timer, let me talk some. It looks like you have about run out of anything to say anyway."

"Give me a match then, and shoot."

"Well, as I started to tell you, in checking up on our last visit through the mill, I ran into several little things that I thought were not bad ideas.

"For example, you remember the system you explained to me about marking my filling by putting the style of goods on the tag which we place on each box as it is sent from the spinning room? I adopted that same idea with my speeder roving and on the intermediates and slubbers I put the number of the frame.

"I also found that many of my good weavers did not know how to fill batteries, that is they did not know how to make time in filling batteries. Therefore, I took the best weaver I could find off of his looms and let him spend two days teaching the other weavers the fine points of filling batteries.

"By George! the next Monday morning I had found four weavers to ask for more looms."

"That reminds me Jim, I was once talking to a body of textile students, and in trying to get them to understand how to study, I told them that 'Education is not learning by rote. Education is not learning a bunch of rules, because rules are soon forgotten. Education is nothing more

Cheating on Time

A Conduit Fitting That Has Created a Sensation With its Time Saving Features

In textile mills where time is so costly, Kondu-Threadless Fittings have won the warm recognition of every plant superintendent. With this perfected invention it is now possible to "cheat the clock" on every installation. Difficult jobs can be quickly handled with ease. A wrench, hacksaw, and reamer are the only tools needed.

This ease of installation is accompanied by strength, rigidity and continuous grounding that is permanent. Kondu-Box permits bending of the conduit—eliminating excessive fittings.

Time will defeat you in your efforts to economize if you continue old methods of installation. Write today for detailed information on Kondu-Box, the sensational time saver on conduit installations, and learn more of its economical possibilities.

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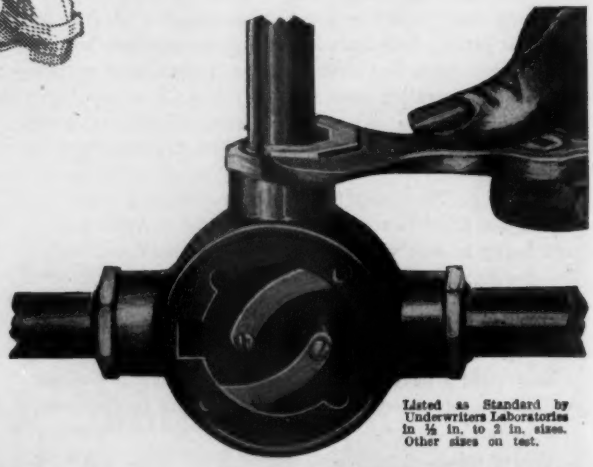

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KONDU-BOX

REGISTERED U. S. PATENT OFFICE—REGISTERED IN CANADA

THE THREADLESS CONDUIT FITTING

than *understanding*. If you understand a problem you can remember it.

"I well remember when I first began to study mill calculations—figuring the number of yarn to produce a piece of cloth was one of the first things I tried to remember. The old rule to get the average number of yarn for print cloths was about as follows:

"Take yards to pound, multiply by inches wide. Then multiply by the sum of pick and sley and divide by 840, less percent for size and contraction.

"I wrote that rule down on a small piece of paper and carried it in my apron pocket. (Section men wore aprons instead of overalls when I was a section man).

"Every time I had a chance I would take out my little piece of paper and read my rule—when I went to dinner I would lay it on the table and study it—I kept this up until I learned that rule like a parrot learns to say damn.

"Then I started to figure the yarns for every style of goods I could hear of and compare my figures with the numbers of yarn the mill was actually using to make that style of goods. Sometimes it worked and sometimes it didn't, and darned if I could understand why. But when I fully *understood* the following formula, I had no more trouble:

$$\frac{\text{Length of yarn in yards}}{840 \times \text{count} \times \text{weight in pounds}} = 1$$

"You know Jim, you can do most anything in the way of yarn calculations with that formula. You can get the production of a spinning frame, a speeder, or any other machine. For example, a spinning frame is making:

"100 r.p.m. $\times$ the diameter of the front roll $\times$ 600 minutes per day $\times$ 224 spindles, divided by 36 inches (1 yard) $\times$ 840 $\times$ 30s yarn = pounds of 30s yarn spun in 10 hours at 100 per cent.

"If a warper beam has 400 ends on it and 8 wraps of 3000 yards each, how much does it weigh?

$$\frac{400 \text{ ends} \times 8 \times 3000}{840 \times 30\text{s}} = 381 \text{ pounds.}$$

"Suppose you are making several numbers of yarn and the warper hand forgets to properly mark one of the beams so you do not know what the number of yarn is on that beam. Simply put the beam on the scales, and if it weighs 381 pounds then you can find out the number of yarn from the same old formula.

$$\frac{400 \text{ ends} \times 8 \text{ wraps} \times 3000 \text{ yards to wrap}}{840 \times 381 \text{ pounds}} = 30\text{s yarn.}$$

"Yes, Old Timer, those calculations are very simple when you understand the formula, but that formula you mentioned when I first came in is far more important to overseers and superintendents than any calculations you can teach us.

"It is a pretty hard thing to say that 'No human being, or at least the large majority of human beings, will *continue* to carry out orders or suggestions that have been given them by their superiors without continually checking up on them'."

"Sure it is Jim, but if you think you can merely tell people to do things and then expect them to keep on doing things—you have got another think coming.

" You know it is a fact that you have to 'make a man make money for himself'."

"How's that, Old Timer?"

"I said, you have to 'make a man make money for himself' and that is just exactly what I mean, Jim.

"Take your weave room for example. You have a good set of weavers—they are mostly married men who have families to support, and those weavers all know that the better they run those looms, the more money they will make, don't they?"

"Sure they do—what are you driving at anyway?"

"Wait a minute. Suppose you have them all come out to your office and tell them something like this:—

"Gentlemen you are all intelligent men—you know how to get production out of your looms—you know how to make first-class cloth—you know the more cloth you weave the more money you will make.

"I have an overseer and two second hands in that room that are costing about $100 per week, I am going to pay them off and give all of you that $100 per week by paying you one cent more per cut.

"Now go to it, gentlemen, run the dickens out of those looms and make more money for yourselves and families, and not have the overseers and second hands bothering you.

"Then you get you some good detective stories, Jim, and prop your feet up on the desk and stay out of that weave room about 30 days.

"Then you take a walk down that way in about 30 days, and here are some few of the things I predict you would see and hear.

"First, as you pass the toilet, you would smell cigarette smoke.

"You would see a set of looms standing, and you ask the next weaver where that fellow is.

" 'Oh, he told me as I passed his house this morning that he had to stay out today to help the old lady wash.'

"At the next set you find stopped the side weaver would probably tell you that John had just stepped up to the post office to see if his Sears Roebuck catalogue had come.

"You turn in disgust to find the cloth room man who has heard you were in the mill and he says, 'For God's sake, man, come here and tell me what to do with this pile of seconds.'

"No need to go on with illustrations, Jim, except to tell you that if you leave those *good* weavers alone—your production will hit bottom—your seconds will hit the ceiling—the weavers can't make anything, therefore they will quit your mill and go over to that other mill where they are 'made to make money for themselves'."

"I give up, Old Timer, but Gosh! Isn't a human being a strange animal anyway."

"Yes Jim, and what I am trying to show you is that the overseer or superintendent who is absolutely honest with his operatives—shows no partiality—makes no promises he does not fulfill—uses all his brains to educate his operatives to the highest efficiency in the operation of the machinery and then has the backbone to:

" 'Make them make money for themselves' is the successful overseer or superintendent."

* * *

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Practical Discussions by Cotton's Readers On all varieties of Mill Subjects

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

Wishes to Keep the Yarn Even.

EDITOR COTTON:

I would like to enter a question in "How Other Men Manage" regarding the sizing of roving and yarn. Few men are willing to admit getting lost at times, but here I am going to say "I for one get lost." I make a change only to find that I get hold of a heavy or light size and not a fair average. I always look at the rolls and weights and feel the roving in the creel, which will be hard or soft if it is not up to standard.

We do not have humidity enough, and have to do a lot of guessing and a lot of changing or our weights will be off on the finished cloth five to ten pounds to the 500-pound bale, and our roving and yarn varies from five to fifteen grains; roving five and yarn fifteen at times, and the change must be made on the filling, where we have a one-day run ahead all the time. We cannot wait to see the cloth, but must hold our yarn as near as possible to the mark. When we select a four-bobbin size they are apt to be four grains each heavier or lighter than the average of the whole frame, no matter how carefully they are selected.

As I see it, the cotton will not draw alike under our conditions, with say 37 per cent relative humidity in the afternoon, and 65 per cent huimidity in the morning.

Will the leather rolls hold the cotton at all times the same while it is being drawn, or does the roving slip through the back and middle rolls a little faster when the air contains 65 per cent humidity and the fibers are lying close together? Is the weight on the rolls lighter at times than at others? Some claim it is all water when the yarn gets heavy, and the humidity is high, but my experience has been that it is part cotton and part water, my idea being that the roving slips through the back and middle rolls a bit faster than they free it when the staple is lying close together. I have weighed yarn run with the same draft gear and have laid it aside until a dry day, and it lost some, but not enough to show that water was the cause of it being heavy, because it was part cotton and part water.

I wonder if others have had this trouble. On a dry, cold day our yarn will lighten up about four or five grains per 120 yards, then the filling must be heavied five grains to hold its own and seven to make up the warp. Then in one day's time the humidity goes up and the yarn gets five grains heavier and the warp seven. Then we find that the filling is 24 grains to one skein too heavy for we have changed twelve grains heavier when it was twelve light, then it turned over to twelve on the heavy side. But we never go the full amount as we must turn with the humidity. We change about half enough to make it heavy enough and then watch like a dog at the corner of the fence and run out at it when it starts back the other way. We would be glad to hear how some others handle this.

Now, a good humidifier system would be all right, but anyone can buy a fine race horse and win the race and we are after getting all possible out of our old "plug", and we may get the racer later.

We spin 3s to 17s yarn from 1.00, 1.30, 1.60 hank roving. We open and feed a little from each bale of cotton, one day's run at a time; we have three processes of picking, two of drawing, slubbers and intermediates and single roving in the spinning, using Texas bollies cotton.

I would appreciate any suggestions your readers may have.

CONTRIBUTOR No. 1034.

Checking Costs on Roller Covering.

EDITOR COTTON:

I would like to see some discussion in the "How Other Men Manage" department on the subject of roller covering. I should be interested to know of any mills that pay for roller covering on a piece work basis.

Along this same line, if any of your readers would give the information I am sure it would be useful, as to the cost to the mill for cleaning rolls, cutting the cots and cloth, cementing the cots and putting on the cloth and leather. Also the cost per 1,000 shells or rolls.

If any of your readers will give us any information on this general subject, or any answer to any or all of these particular points, we shall appreciate it.

H. C. (S. C.)

Making Cleaner Yarn.

EDITOR COTTON:

In reply to the question which "Contributor No. 1019" asks in the December issue regarding a remedy for improving his 40s carded yarn, I would advise him, first of all, to watch his carding section, and, especially if the cards are being stripped by the brush, to see that the strippers or card tenders break the ends and allow them to run through the calender rolls until they are heavy enough to piece up in the can.

This trouble of pods, and small impurities in the yarn, occured in a mill of my knowledge a short time ago, and it was remedied to a very great extent after tracing it to

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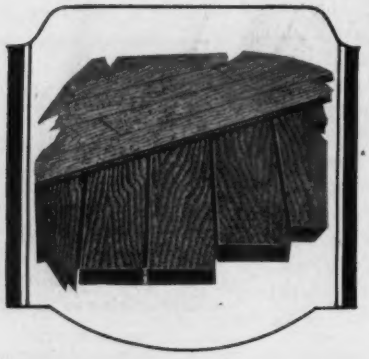

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the cards, where the strippers were allowing the ends to run into the cans without breaking them at the coiler top, hence the end was pieced up at the calender rolls where a great amount of small impurities covered the portion where the piecing was made, and also after being pieced in this manner, the result was either a lump or a weak place, together with the dirty matter passing into the can.

In addition to this, "Contributor No. 1019" should pay great attention to those who clean his cards, especially when cleaning the fronts, because it has always been my experience that card strippers or anybody cleaning cards prefer to use a so-called "mop" instead of a hard brush, and by using this mop they pay very little attention to whatever might be carried along in the web, as long as they can "get by" quickly with their cleaning.

Of course we all know that cleaning cards is not a very pleasant job, but I must say that careless cleaning of card-fronts especially together with neglect to break the slivers at stripping time, is one of the chief causes of the impurities found in yarn.

Maybe "Contributor No. 1019" has attended to these things but I thought it was part of my answer to his query, so I quoted my own experience in this matter, and the cause of our trouble, which seems to be similar to the one he mentions.

Of course, he says that the yarn is very clean for carded yarn. Probably, but it seems to me that the impurities may be in those certain places as mentioned, where the ends may be pieced at stripping time, and these portions will, no doubt, resist twisting to some extent.

I also think that he would do well to reduce his breaker lap from 18-ounce to say 16-ounce, and also have four laps on the finisher instead of three, making say a 14-ounce lap. His card settings seem to be perfect if they are all set as stated, but for 40s yarn I would increase the twist from 22.16 to about 23.

I notice he does not say anything in his letter about his lay-out of drawing, etc., and perhaps he will find the cause of the trouble there. Perhaps not sufficient ends up at the first drawing, or clearers not receiving attention regularly, or the knock-off motions out of order.

I also am wondering what kind of drawing rolls he uses on all of his frames, and if he happens to be using cork-covered rolls, let him give the leather ones another chance, and I would ask him not to trouble about "frictional contact."

As a last attempt at solving this problem, I would advise that he try an extra stripping of the cards, and if he is using the vacuum process give the brush a chance to clean the wire once in a while and his carded yarn, provided his cards are set right, will have very, very few pods in it as well as other dirt. I do not think the tape on the frames can cause any of the trouble, provided the tapes are adjusted properly and all possible slippage eliminated. D. E. (R. I.)

The annual convention of the Kaumagraph Company, makers of Kaumagraph dry transfers and Indello markers, lithographic box tops, hosiery packing, etc., was at the Hotel Pennsylvania, New York, on December 28th and 29th. Branch representatives throughout the country attended. Hugh R. Munro, president, Trowbridge Marston, general manager and T. H. Miller, treasurer, were among the speakers at the banquet which concluded the sessions.

Sizing a Warp Without Starch.

EDITOR COTTON:

I am writing to get some information through COTTON with reference to sizing cotton warps. We have a customer who wants his cloth to be starch-free, that is sized without any starch. I have been trying fish glue, but it has no body, and does not penetrate the yarn; and therefore causes an excessive amount of shedding and bad running warps. This is an entirely new proposition with us, and we would like to get some information of value.

We make a 44x40 cloth, using 30s warp yarn, slashed with this size made from glue. I use from 100 to 150 pounds of glue to the kettle of 120 gallons of water. I also tried 50 pounds of glue to the kettle, but none of it will run. We do not want any starch or wax in the size. The cloth must be starch and wax free. I have been trying to find a gum to use in making my size, but have not got it yet.

The cloth is made for gauze, and the reason the buyer does not want it sized with starch is that he gives a boil bleach instead of de-sizing it; and if the cloth has any starch in it, it will not come out in just the bleach. The buyer is satisfied with the cloth sized with glue, but I haven't got the sizing formula right or else I lack something in the glue to make it bind or penetrate the yarn.

Any suggestions your readers may be able to offer will be sincerely appreciated. CONTRIBUTOR No. 1038.

Selecting the Man for the Job.

EDITOR COTTON:

I want to ask a question, and wish all overseers and superintendents who read it would give me their honest opinions about it.

About eight months ago a textile student began work in this mill. Two weeks ago my overseer left me for a job with more money in it, and I am undecided as to whether to put the fixer or the student on the overseer's job, as I don't want to send away for a man without giving one of these men a chance. I would like to hold them both, for they seem to be good men, but I can't put them both on the same job, so I am asking for opinions.

Let us look at this thing from both sides. We know that the student has spent several hundred dollars for his textile education in order to get an overseer's job and some day, maybe, become a superintendent. And we know that the fixer is looking ahead to the opportunity of having a bigger job some day. Of course, the fixer didn't begin his textile work last week or last year; if so, he couldn't be a fixer, he would be called a screw-driver or monkey-wrench man, and that kind don't stay on a job long. So I am not speaking of a monkey-wrench man, I mean a fixer, the key-man you call on when your production is low.

I would like to hear a few words from "Old Timer" about this, if he will leave off his and Jim's work long enough. I have been reading after "Old Timer" for four years, and have always found his advice right, to my notion, and have taken it as much as I could, and am ready to hear from him some more. I want advice, as these two men are looking for a square deal and I want to give it to them. CONTRIBUTOR No. 1033.

FIG. 1

FIG. 2

FIG. 3

FIG. 4

Saving Waste at the Slasher and Loom.

EDITOR COTTON:

The waste loss at the head of a slasher caused by doffing the full warp and the starting of the new beam is a constant source of annoyance to many mill superintendents and men in charge of the slashing department. Unless the slasher man is held to a strict accounting or some saving method is adopted and adhered to, the waste pile will wax exceeding fast, with a waste of good yarn that has cost real money to prepare, and waste due to indifference and carelessness in handling this process.

The supervision at this point must be close, and there are some mills where those in charge are keenly alive and realize the amount of yarn that can be saved and woven into cloth instead of getting the waste price.

In the dim past, "beyond the ken" of this generation, when starting a new beam, the yarn from the slasher was tied to an apron and when in the loom could be woven right up to the knots, so that in mills with a few thousand looms, it can readily be seen that many yards of cloth were gained in the course of a week, month or year that otherwise would go into waste. This apron was a stout piece of cloth about a yard in length, with six good-sized holes in one end, worked with a button-hole stitch to prevent pulling out; the other end of the cloth was tacked onto the barrel of the beam, and holes were made in the barrel of the beam at the place where the knots would lay on the beam, thereby making a smooth start. When the beam was put into the slasher the yarn from the slasher was split into the six sections, and each section tied to the corresponding hole on the beam apron.

This method was discarded possibly for the reason that it required a little more time to tie the knots than it did for using a stick or a string—or the easier way of simply separating in two sections and wrapping the yarn around the beam regardless of the fact that the yarn was bunched in these two places and caused a terrific strain on the yarn at those points, making it impossible to weave down to the barrel on account of the breakage of the yarn.

With the advent of the warp-tying machine, mills using this time-saving device discovered that a vast amount of yarn waste could be avoided by the use of a tape of sticky paper, put on at the

proper place when doffing the warp and the warp dropped onto a truck instead of the floor.

While this contrivance could be used advantageously on plain work, to the maker of fancies this scheme did not mean a whole lot, they seemingly having to allow for considerable wastage before getting down to the business of weaving cloth.

In one mill that I know of the method of doffing and starting a new warp looked so good that some photographs were taken, and I am sending them along herewith to explain fully how a big saving can be made, even with fancies, as I consider this method well worth investigation.

The full warp with the required number of cuts is shown in Fig. 1. The cut-mark has gone around the beam once, the lease string being on the under side out of sight. The papers are put on as shown in the photograph, and the yarn is ready to be cut, as shown in Fig. 2. Two strips of sticky paper can be seen here, one across the beam, the other across the front roll. These can be varied as to distance, of course. After the friction has been let off, and the beam with the yarn slackened, the yarn is cut and the beam is ready to be dropped onto a truck. It will be noted in the illustration the cut has been made about six inches from the sticky tape. This of course can be varied as to distance, either closer to the paper or nearer the beam, as desired.

At the stage shown in Fig. 3, the empty beam has been put in and preparation made for a good start. In many of our mills, sticks are used, and if no sticks are at hand, the yarn is simply split into two bunches, the slasher man taking one and his helper the other, and the yarn is simply wrapped around the beam. This tends to put an additional strain on the yarn, for some little time even after the press roll is put on, due to the bunches of yarn when wrapping around the empty beam.

Passing on to the next illustration, Fig. 4, it will be noted that the operator and helper have simply taken hold of each side of the paper, the machine is started up on *slow motion*, and the yarn and paper brought down onto the beam. Then by holding the paper in place while the beam is still turning, the paper and yarn attached are carried around the beam where they are caught by the next fold of the yarn coming down onto the beam.

It will be noticed that there is no pulling in of yarn on the sides, but a full width start is made, insuring even tension on the yarn all the way across. Here we have shown, a pretty, even sheet of yarn on the first full turn of the beam after the paper has been put on the beam and brought around so that it will be caught with the yarn coming from the slasher onto the beam. This scheme has been tried and proven, having been used for a number of years in the establishment referred to, and while there may be some device developed later that will give the manufacturer that last yard on the beam, the foregoing description shows a method with considerable merit which may be of benefit to others. S. M. (MASS.)

We have received an interesting letter signed "Texas Boll Weevil," which cannot receive attention because the writer did not give his name and address. We again remind our correspondents that, while this information is kept confidential, it is necessary in order for communications to be published.—THE EDITORS.

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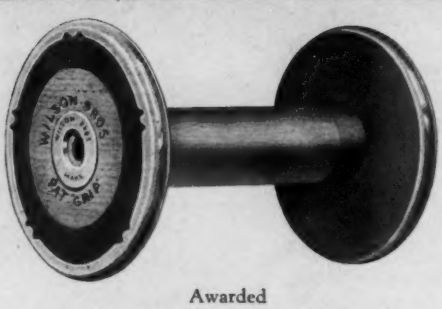

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Which Quill Makes the Mispicks?

EDITOR COTTON:

I would be glad to have some of those interested in weaving answer the following question:

On very heavy twill goods, 33-inch, 11 ounces per yard, where three mispicks or half-mispicks make a second in a piece of cloth 52 yards long, knowing that at least 90 per cent of the mispicks are made on the change, is it the outgoing quill that makes the most mispicks, or the full quill that is going in the shuttle?

Please advise and give the most effective remedies.

CONTRIBUTOR No. 469.

To Prevent the Rolling of Battery Bobbins.

EDITOR COTTON:

It would have been easier to answer the question you published with reference to bobbins rolling in the loom battery if the questioner had mentioned the style of battery he is using.

There are, as all mill men know, several different styles. My experience has been limited to four different styles—the old 14-bobbin style, Draper No. 1, No. 3 and No. 13.

In the first place, if he is running very old and worn bobbins, that is, worn on the barrel end, he has got some job to stop them from rolling, but if he has got good bobbins, I think I can help him out of his trouble.

Practically all loom fixers, when setting a battery for bobbins, place a bobbin in the battery and turn the battery around until the bobbin comes under the transferer fork, then tighten the disc, but that is not the correct way. The proper way of setting is this: take a new bobbin, place it in the center top of the battery, loosen the set-screws in the disc, move the disc so the barrel end of the bobbin will come in full contact with the battery head. To do this keep turning the bobbin, and when it is perfectly flat on the battery head, it will not turn to one side or the other. Then tighten the set-screws and be sure that the bobbin will release from the battery quite easily. Now turn the battery so the bobbin will come under the transferer, set the transferer fork to come on the end of the bobbin, with space on each side of the bobbin. If Draper castings are used, this will be easy.

Now, if the old 14-bobbin battery is used, see that the feed arm does not strike on the spring roll on the sword top when not in action.

If the No. 3 or No. 13 Draper battery is used, see that the feed pawl does not have any play so there will be no back motion to the battery.

If running a No. 3 Draper battery, send to the manufacturers and get a sample Stimpson battery feed, which consists of feed pawl 3850 BY, feed pawl spring 3956BY, feed pawl case 3957BY, hold back pawl 3884BY, which, if the bobbin is set in the battery as I have explained, will remedy the trouble.

I want to lay stress on the point I mentioned about getting the bobbin set in the battery so that the barrel end of the bobbin will come in full contact with the battery head.

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to run the bobbins tighter in the battery, which will help to keep them from rolling. If the regular Draper or Platt bobbin support is used, all the better.

P. T. S. (MAINE.)

EDITOR COTTON:

In reply to "T. R. (S. C.)", I don't know of but one or two things that will cause the bobbins in loom batteries to roll, as he outlines in his question in a recent issue of COTTON. One is the bobbins being large; that is, the filling being built up in too large a diameter, and the rocker shaft bearings being worn enough for the lay to raise sufficiently, as the filling is beat up in the cloth, so that the shuttle box back strikes the bottom of the bobbin. But if it did this often enough the filling on the bobbin would be chafed enough to cause the filling to break later on as it ran down on the bobbin.

Another thing would be for the battery to rock a little or rotate back and forth just a little due to the vibration of the loom and a weak transfer spring. In this case, more tension could be put on the spring.

Now I will endeavor to tell just where I think the cause of this trouble lies. I do not think the bobbins are rolling enough to break the filling. The filling is being cut on the bobbin tip disc by the shuttle box back as it passes under the battery. Sometimes this can be detected immediately by the box back having a bright place worn on it right under the bobbin tip disc. Sometimes this will cut the filling of the next bobbin in the battery in just a few picks. Sometimes it will be almost time to change the filling again before it will cut the filling. And again, it may not cut the filling entirely but will chafe it up enough to weaken it so as to finish breaking it as the transfer is made.

This trouble can be readily eliminated by loosening the hopper stand and slipping a piece of cardboard under it so as to raise the end of the magazine a little higher over the shuttle box.

I was stuck mighty hard on this very thing once myself, and it certainly took some perseverance to pull through, and I am only too glad to pass my experience on to "T. R. (S. C.)" and other readers.

Another thing that will break the filling in transferring is for the picker to be worn, allowing the shuttle to go too far up into the box. This causes the heel of the bobbin to strike too far back on the shuttle spring, thus forcing the bobbin tip down through the shuttle far enough to snap the filling in two before the spring receives the bobbin. This will also cause the shuttle to miss the bobbin sometimes and also make a smash in the warp occasionally.

Another cause of breaking the filling in transferring is carelessness of the battery hand in not pulling the filling ends properly over the thread guides.

This thing of breaking the filling in transferring is not a small thing. We lose production and have mispicks in the cloth. It is a thing to be looked after just as much as anything else. Some loom-fixers are careless about looking after this or do not attach enough importance to it, and some weavers are afraid to tell on the fixers. This makes it necessary for the boss weaver or second hand to consider it a part of his job to watch for looms breaking filling, and have them fixed.

Perhaps some of us would get along better if we would

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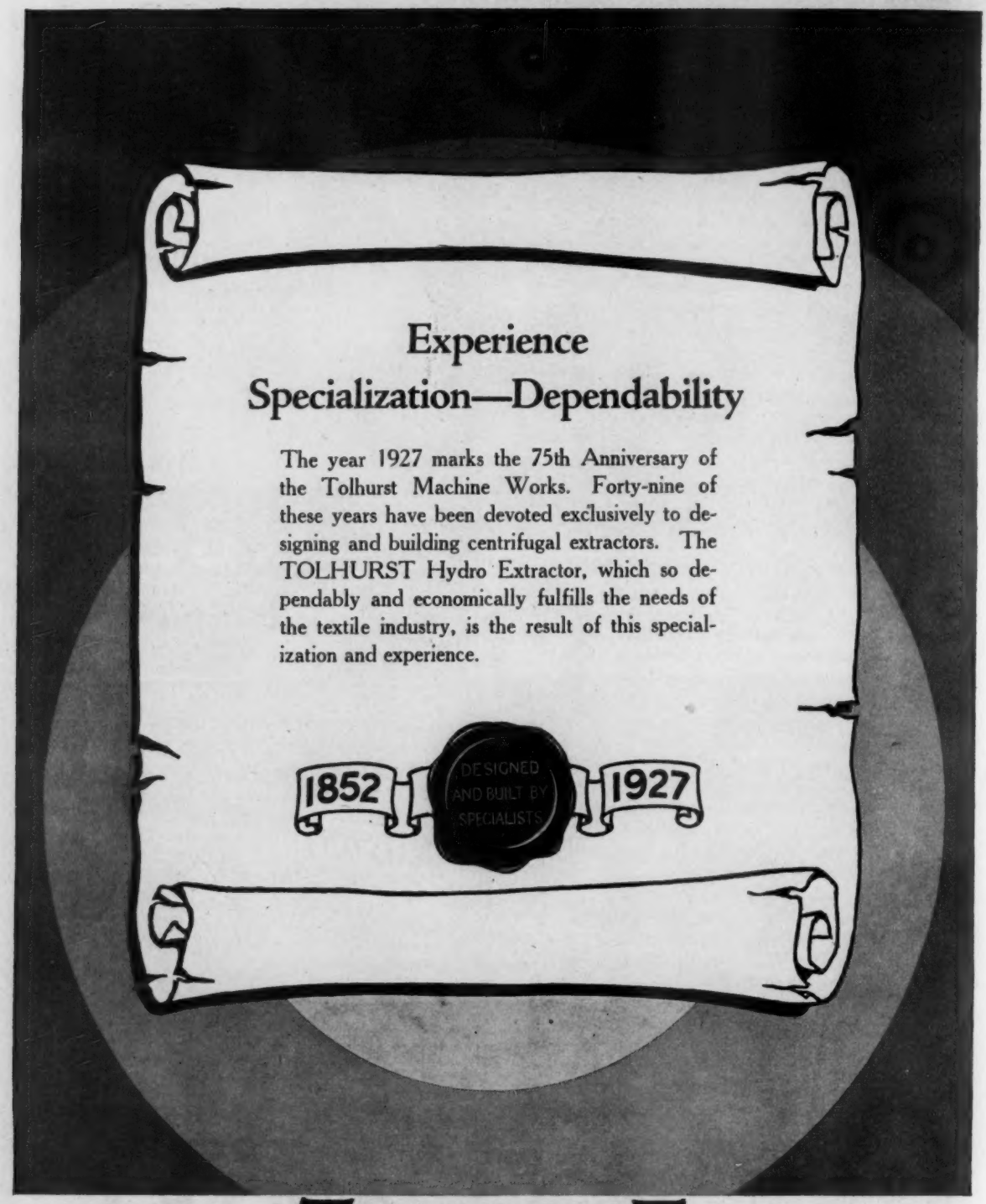
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bring more of our troubles to COTTON instead of trying to fight them out by ourselves.

JACK (TEXAS.)

EDITOR COTTON:

The obvious answer to "T. R. (S. C.)", who reports in COTTON, trouble with batteries on his looms rolling bobbins, would be to close up on his small end disc. I suppose, however, that he has tried this, and still has this trouble. This leads me to believe that all of his bobbins are not of the same length, because this setting has always ended the trouble for me when the bobbins were the same length.

The practical weaver of course can understand what happens here with bobbins of varying length; it is impossible to satisfactorily set the disc for both the long ones and the short ones, and sometimes the only thing to do is to sort the bobbins out and use them on different looms where this can be controlled.

Sometimes the atmospheric conditions have something to do with this. I know that right at the present time we have just gotten a shipment from a bobbin manufacturer who has always furnished us with the right kind of goods, and when they came we measured them in the gauge we use for this purpose and found a lot of them too large to go in the gauge. Knowing that we had had a rainy spell, I asked the overseer to keep some of the bobbins in a dry place for a few days, and this morning we tested them and found them to be all right.

In the weave room, after using bobbins for a number of years, we once found that some of them had worn so, however, that we did have to sort them out because using them together we encountered the same difficulty reported by your contributor.

O. W. (GA.)

EDITOR COTTON:

I noted in a recent issue the question from "T. R. (S. C.)", who says he is having trouble with the batteries on his looms rolling bobbins, which breaks the filling and, when the loom changes, makes it necessary to make a double change before he can get the shuttle threaded. I note what he says about the bobbins always winding up and never off.

I do not think that "T. R.'s" trouble is caused from his bobbins winding up and therefore tightening the filling and breaking it, but I rather believe that if he has any trouble with his bobbins turning, that they really unwind instead of winding tighter, as all the rubbing that we can get our batteries to do would cause our bobbins to unwind rather than wind up. This may be caused by the main bearing in the battery being worn and the bobbin rubbing on the bobbin support, which unwinds the filling causing some slack to come in it, and the picker sticks may be slightly long and catch and break this slack filling.

Then again, the batteries may be set for new quills, and he may have some old quills which, as you know, shorten in use, and these may be turning in the batteries giving the same effect as described.

Again, the rocker shafts may be worn and "T. R." may have taken up on the rocker shaft boxes to overcome this. This, of course, would raise the lay, and the back box plate may be striking the bottom of the battery, cutting

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the thread of the last bobbin between the two.

As stated above, I do not think that "T. R." is having trouble with his bobbins winding tight and breaking the filling from excess tension, but rather unwinding and the slack in the bobbins breaking, which would give the same effect as if the bobbins were winding tight.

If I have not made myself clear on this, and "T. R." or any other reader does not understand what I mean, I will be glad to try to explain more fully.

P. S. (S. C.)

What Causes the Cutting?

EDITOR COTTON:

I am in need of some help from the "How Other Men Manage" department. We are just starting to use some steel heddle harness—our first experience with steel harness. We are trying them on 16-ounce duck, warp counts, 9.75s; 3,492 ends, cloth 38 inches wide; about 20 per cent size on the warps. The heddles are flat steel, two rows of heddles to each harness. The eyes seem to cut the warp ends—from two to a dozen ends at a time. I would like to hear from someone with experience with steel heddles, as to whether it is because the eyes are not polished up enough, or if it is in the setting of the harness or the warp sizing? Any other information will be appreciated.

CONTRIBUTOR NO. 1041.

Paying Weavers on Double Shift.

EDITOR COTTON:

Replying to "Contributor No. 998" as to methods for paying weavers on day and night operation on looms which are not equipped with pick counters.

I have tried several ways, including that of measuring each weaver's production. However, measuring is not practical, and it costs too much. At last we decided that pick counters were what we wanted, and they settled all disputes, so now we use pick counters on all of our looms.

For two years I ran 300 looms very satisfactorily by figuring the whole production and dividing the money between the two weavers, the night hand getting 10 per cent more than the one on the day shift. We had a great many cases of husband and wife, and brothers and sisters and other relationships, and this worked out very well and we had no trouble on this number of looms. However, when we went to 600 or 700 looms, we had some difficulty and kicks, and so we decided in favor of the pick counters.

CONTRIBUTOR NO. 393.

EDITOR COTTON:

As "Contributor No. 998" probably knows, the usual method of arranging double shifts in the weave room is to divide the pay equally between the day and night weavers. This is not fair either to the day or night weaver, as no two people will turn off the same amount of work. It necessarily follows that one or the other will be paid more than he is worth. When this method is used, paper stickers are put on the cloth every time the shifts change so that it can be determined who the seconds and bad work belongs to.

These stickers are the cause of a lot of trouble if the goods are brushed and folded before they are inspected, as they will be knocked off on the way through the machines. Slasher tape, cut into small squares, will stick better than the ordinary sticker. It is better for the cloth to be inspected first in the weave room, and shown to the weaver before it goes to the cloth room. Then the cloth room hands can pull the stickers off as they come to them.

In a gingham mill that I was connected with some time back, we made a very conscientious effort to divide the day and night runs without pick counters, and I cannot say that any of the methods we used were successful. We tried stickers and lost them in the brusher. We tried sewing a piece of cord in the selvage, but found that if it didn't tear the cloth in the brusher, it didn't do us any good after it got through because we couldn't tell which side of it was the day run and which the night run. Then we tried writing on the cloth with chalk. If the chalk was good enough to get through the brusher and folder without brushing off, it was too good to come out in the finishing. The worst of it was that the help found out that we were not very certain of our records after we had given them credit for what yardage we could, and began to make all kinds of claims which we had to allow. Two weavers together would make as much cloth as one weaver should have, and each claim that all of it was his. I remember one of the worst kickers in the lot who made four dollars the first week we had pick counters on. We told him that was all he made and all he was going to get, and the next week he made as much as anybody.

As "Contributor No. 998" is making cloth which is evidently to be finished at some other plant, I think his best chance would be to find some chalk or crayon which will come out in the finishing, and mark his cloth with that, drawing a line to indicate where the change was made, and writing "Day" on one side and "Night" on the other side of the line. Then a careful hand in the cloth room can go through the cloth after it is folded and mark up the yardage due each weaver—maybe. I wish him luck.

CHEERFUL.

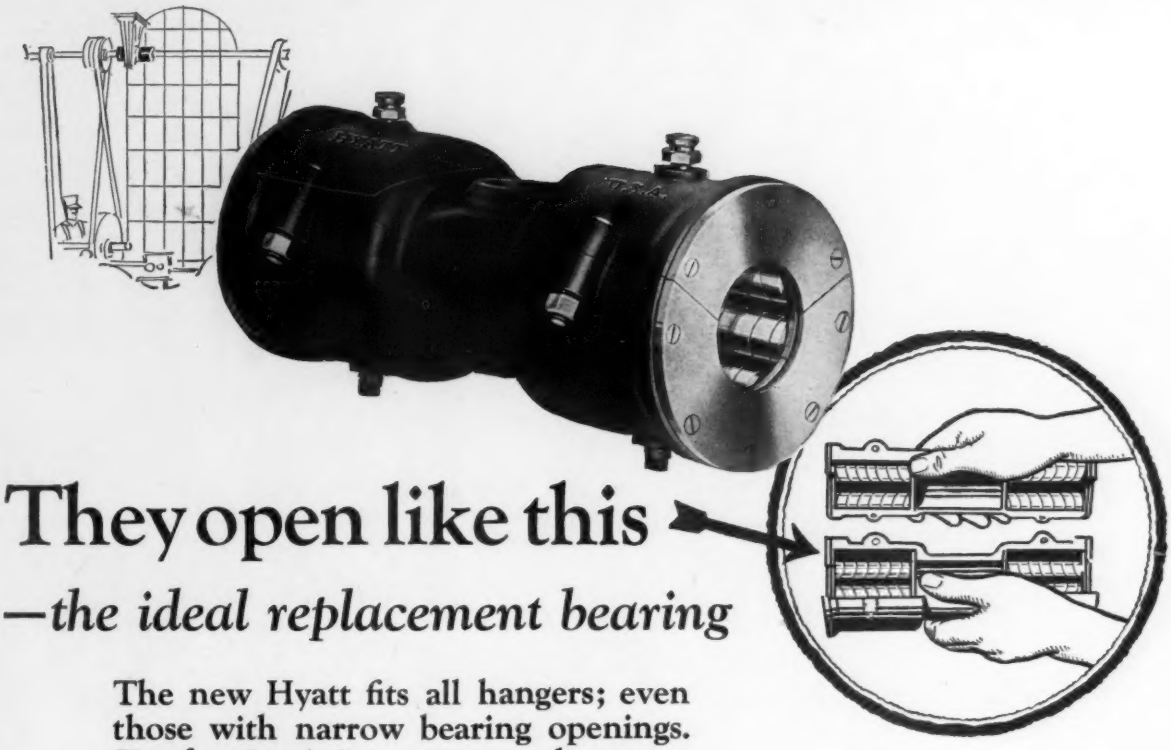
EDITOR COTTON:

I note the question of "Contributor No. 998," who wants to know how to pay weavers by the piece, without the use of pick counters, on day and night operation. We are running English broadcloth on two shifts without the use of counters, and perhaps an explanation of how it is done would be of interest to this reader and others who may be thinking along the same line.

First, the cloth must be marked at the change of each shift by the fixer of both shifts. The day fixer marks it with a blue pencil, writing the number of the loom. The night fixer then writes the same number with a red pencil, This forms the distinguishing mark for determining in the cloth room the difference between the night cloth and the day cloth.

When the cloth is taken off the loom, the loom number is placed on it by the weaver. When this cloth goes to the cloth room it is recorded as single or double cuts merely for a record without regard to whether it was woven day or night.

At the folder there is a checker who sits next to the folder and has before him a yard counter which registers each stroke of the folder. When the change mark comes up which was made by the fixer, the cloth folder hand calls: "Day" or "Night", whichever the mark happens to be on top, either red or blue. The cloth checker sitting beside



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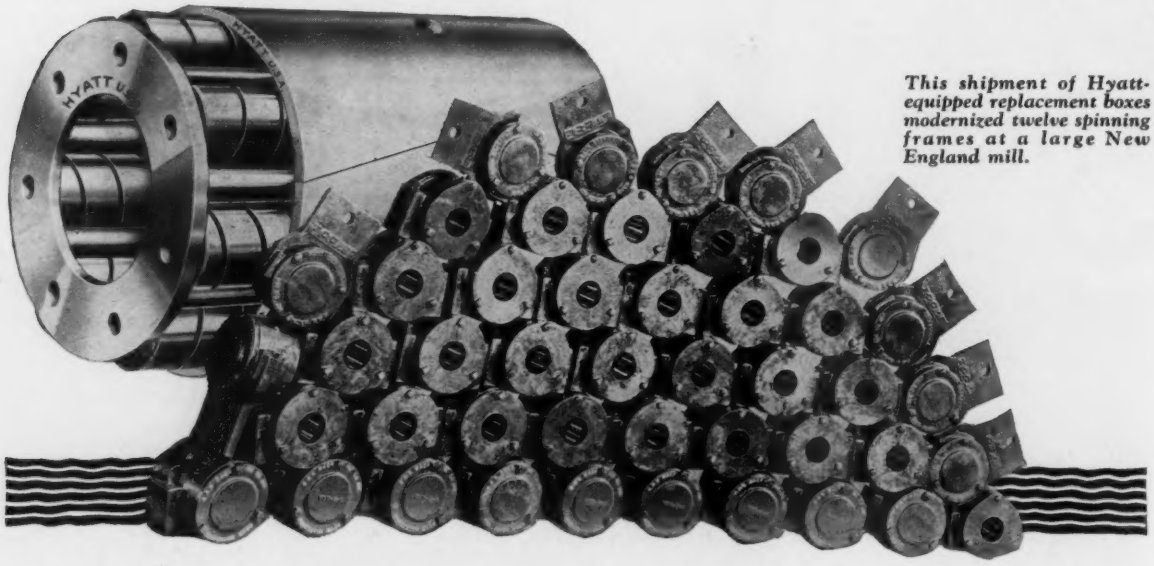

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the folder glances at the register and sees how many yards the folder has counted and puts it down on a large form which has every loom number on it and with a space for day yardage and a space for night yardage. The figure is also placed on a blank piece of paper, and when the next change mark comes up the folder hand then calls "Night," if the previous mark has been "Day." The checker looks at the register and sets it down on the blank paper above the previous yardage figure and subtracts it, the remainder being the yardage that is to be credited on the form to "Night", and so on until the bolt of cloth is completed. The next piece is done the same way. In this manner an accurate yardage is kept of each loom for both day and night.

The yardage sheets are totaled up each day by the checker and the total yards credited to each weaver. At the end of the week a summary of the daily sheets are made and the yardage figured down to cuts by dividing by 60. In this manner a very accurate check is kept of each yard made, to which weaver credited and whether it is "Day" or "Night", all without the use of the pick counter. J. R. W. (N. C.)

EDITOR COTTON:

In reply to the question of "Contributor No. 998" in the November number of COTTON, in reference to paying weavers by the piece without at the present time installing pick counters, will say that I think the best way for him to do this is to have the day weaver write his name on the cloth at stopping time and have the night weaver do the same. The cloth room man or percher can keep track of the number of yards between the names, and in that way the yards per weaver can be tabulated and paid for accordingly.

Have the weavers mark the cloth with some kind of crayon that will easily bleach out.

I hope this will be of some assistance in solving the problem of "Contributor No. 998."

S. J. (Conn.)

Machine Layout for Combed Yarn.

EDITOR COTTON:

In answer to "V. F. (N. C.)" who asks for a machine layout for making 30s and 40s yarn from 1 1/16-inch cotton, combed, will say I notice that he is using 1 1/16-inch middling grade cotton and his picking layout consists of a bale breaker, two Crighton openers, a breaker, intermediate and finisher picker. To begin with, I think he is doing too much picking. My idea of a layout for this would be a bale breaker, one Crighton opener and one breaker and one finisher picker, and if he ran this way I think he would get a yarn that would be much stronger, just as even and equally as clean as with the process he is now using.

Now for the speeds of these machines. The 3-blade beater running at 940 r.p.m. on his bale breaker would seem to be all that could be desired and his setting of 3/16-inch should be all right.

On his Crighton openers, if he must use two, I think a speed of 600 r.p.m. for the first and 700 r.p.m. for the second, would be best. This would allow him to do a maximum amount of cleaning providing his draught, that takes the cotton away, is not too strong. This draught should be just strong enough to take away the cotton and not strong enough to draw any of the dirt out of the machines.

The speed of the 2-blade beater on his breaker picker should be approximately 1000 r.p.m. and his fan speed should be as low as possible, just strong enough to give him air current sufficient to distribute the cotton fed evenly on his cages. Never, under any circumstances, should it be over 1200 r.p.m., and it seems as though it would be better if it were about 950 r.p.m. If it is necessary to run a fan speed over 1200 r.p.m. in order to get an even sheet, then the size of the dust chamber and flue is not large enough.

I note the finisher pickers are equipped with Kirschner beaters, which I consider very good if set right. The proper setting for a Kirschner beater on staple cotton is to set the beater ⅛-inch from the cut off plate and then set the feed roll to the beater so that from the bite of the feed roll to one-half the depth of the pins on the beater will be equal to the length of the staple of the cotton, but of course, with 1 1/16-inch cotton this would have to be varied a little, and I think if the beater were set to the cut-off plate ⅛-inch and then the feed rolls set ⅛-inch from the outside of the feed roll to the point of the pins, that will be the best setting which can be obtained. This would give 1 1/16-inch from the bite of the feed roll to the point of the pins, providing the feed roll is 2¼ inches in diameter and a fluted roll.

My idea of a proper speed for this beater is about 750 r.p.m. and the fan speed should be about 1,000 r.p.m.

The cylinder speed on the cards should be between 165 r.p.m. and 170 r.p.m. I prefer a licker-in speed of about 350 rp.m.

I think it would be found if the card sliver were lightened to 37 grains and the doffer speed run up to 8½ r.p.m. better carding would be the result, with the same production. In these figures I am presuming that the cards are 40 inches wide with 27-inch doffers.

Card settings should be as follows:

Doffer to cylinder, .007.

Flats to cylinder, .009.

Feed plate to licker-in, .007.

Licker-in to cylinder, .007.

Top mote knife to licker, .010 at about 18° angle.

Bottom mote knife to licker, .012 at about 18° angle.

Licker-in screen to licker-in, .029.

Cylinder screen to cylinder starting from licker-in end as follows; if there are three setting points:

Point nearest licker-in, .017.

Center point, .034.

Front point, ⅛-inch.

Back plate to cylinder top edge, .034.

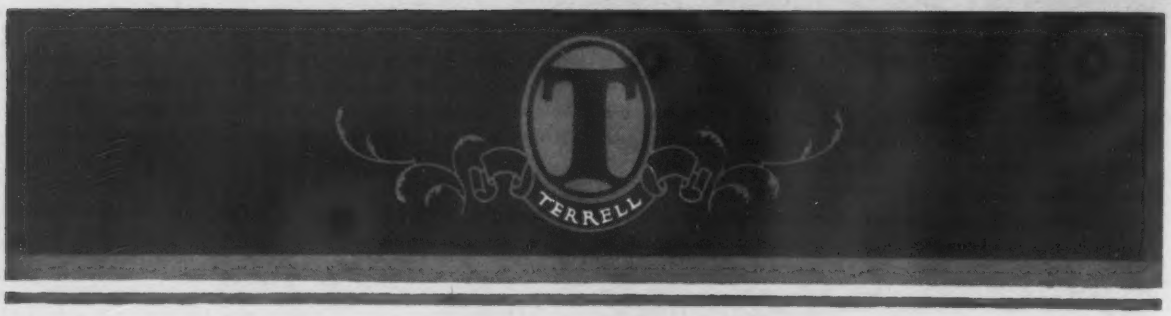
Front plate to cylinder top edge, .034.

The sliver lap machine, assuming that "V. F." has 24 ends up and that he uses a 37 grain card sliver, should be 550 grains per yard. This will give a draft of 1.60. The rolls on this machine, starting from the calender rolls and working back, should be as follows: 1st to 2nd roll, 2 inches; and 2nd to 3rd roll, 2¼ inches.

This wide setting is due to the bulk of cotton going through and also the short draft on this machine.

The ribbon lap machines, assuming that they are of the four lap in the creel type and using a 550 grain lap on the sliver lap machines, should weigh 610 grains per yard. This gives a draft on this machine of 3.66.

Rolls on the ribbon machine should be set as follows: 1st to 2nd, 1½ inches; 2nd to 3rd, 1⅝ inches; and 3rd to



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4th, 1¾ inches.

Combers producing for these counts should produce approximately 17½ pounds an hour to do good work, and I do not believe any comber can produce more than this and do it right.

In this combing layout my idea would be to use a 610 grain lap taking out 14 per cent waste making a 52 grain finished sliver. This, with the calender roll in draw box running 170 r.p.m., 2¾ inches diameter, at 96 per cent production efficiency will give "V. F.," assuming that this is a six head machine, a draft of 63.6 and a production of 17.4 pounds per hour.

My opinion is that no draw box calender roll should run any faster than this, because if it does, then the draft rolls in the draw box must travel at such a terrific speed that it will cause uneven drawing, split fibers and an excessive amount of licking up on the front roll of the draw box. Also, if it is run at a greater speed than this he will have to do a lot of roll varnishing, as the friction caused by the excessive speed will wear the varnish off the rolls; also, it would not be wise to run a sliver heavier than 52 grains due to the drafts in the succeeding processes.

Drawing frames, both breaker and finisher, should run the same weight sliver as the comber, namely, 52 grains, making a draft of six on each process and the front roll should run between 300 and 320 r.p.m.

The layout of machinery for 30s yarn is o. k. with three processes of speeders, but to make the best grade of 40/1 yarn there should be four processes, but as "V. F.'s" machinery calls for three processes we will lay it out to what we think is the best advantage.

Making as "V. F." has it, a .70 hank slubber roving, warp intermediate 1.80 hank, warp speeder 5.25 hank, for 30s yarn: filling intermediate 2.00 hank, and filling speeder 6.80 hank for 40s yarn. Then his speeds seem to be too high. I would use a spindle speed of about 580 r.p.m. on slubbers and a spindle speed of about 860 r.p.m. on intermediates and a spindle speed of about 1175 r.p.m. on the fine speeders.

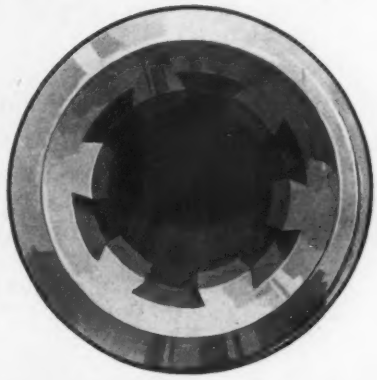
A rule that I have used for twist in combed roving for a good many years is as follows: (One, multiplied by the square root of the hank roving, equals a dividend.) (Two, times the length of the staple of cotton used, equals a divisor.) Then divide the dividend by the divisor and the square root of the answer will equal the turns of twist per inch.

A summary of weights and drafts would be as follows:

	Weight		Doublings	Draft	Waste
Breaker picker	14.5	ounces			2.00%
Finisher picker	12	ounces	4	4.11	1.50%
Carding	37	ounces		134.08	5.50%
Sliver laps	550	ounces	24	1.61	
Ribbon laps	610	ounces	4	3.60	
Combers	52	grains	6	63.6	14%
Finisher drawing	52	grains	6	6.00	
Breaker drawing	52	grains	6	6.00	
Slubbers	.70	hank		4.37	
Intermediate, 30s yarn	1.80	hank	2	5.43	
Intermediate, 40s yarn	2.00	hank	2	5.71	
Speeders, 30s yarn...	5.25	hank	2	5.84	
Speeders, 40s yarn....	6.80	hank	2	6.80	
Spinning 30s yarn	30/1		2	11.21	
Spinning 40s yarn	40/1		2	11.73	

If it were possible to have four processes of speeders to make the 40/1 with I would go back to the slubbers and run as follows:

—from the tightest set without damage



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Intermediate	2.00	2	5.33
Speeders	5.70	2	5.70
Spininng	30s	2	10.52

Then as follows for the 40s single:

	Weight	Doubling	Draft
Slubber	.60 hank		3.75
1st intermediate	1.20 hank	2	4.00
2nd intermediate	2.90 hank	2	4.83
Fine Frames	8.00 hank	2	5.52
Spinning	40.00s	2	10.00

This last layout I know will make a much better piece of yarn, but sometimes a man has to be governed by the amount and type of machinery he has, then he has to use his own best judgment in order to get off the production required. T. O. D. (MASS.)

EDITOR COTTON:

Concerning the question asked by "V. F." in the September number in regard to installing combers in a carded mill, I thought that I would present my views inasmuch as "V. F." seems to have a somewhat peculiar hang-up. I note especially the picking hang-up. It looks to me as if he were picking the cotton too much.

The card hang-up is very good except the feed plate setting, which is a little too far for 1 1/16-inch cotton.

The slubber hang-up is pretty good, but if the draft were 3.95 or 4.00 it would be better.

The intermediate and speeder hang-up is okeh. Also the spinning is very good. But the filling draft is a plenty.

In putting in combers "V. F." can come right up to his doubler with his 42-grain card sliver and put in ends enough to make his required weight for the doubler lap, which I will give in my hang-up.

Also, in putting the combed work in the drawing, if he wants to keep the same weight as the carded he will have to run less ends up at the back. But he could let his back drawing come up to 50 grains by drawing a little more and still keep his ends, as the six ends will tend to help the evenness in the yarn. On the finished drawing he could still maintain his 50 grains by drawing a little more, which will not do any harm. A little increased draft on the drawing is not harmful as in the following processes, because there is the bulk of slivers to be considered.

In the care and upkeep of combers I would advise getting from the Whitin machine shop one of their books entitled "Cotton Combing Machinery." It gives information as to setting, oiling, cleaning, varnishes, etc.

Using the inquirer's hang-up as a basis the comber hang-up will be as follows:

Sliver from cards, 42 grains.

Doubler or sliver lap, 650 grains.

Ribbon lap, 650 grains.

Comber sliver, 55 to 60 grains. 60 grains is a good weight.

Comber waste 12 to 14 per cent. Nips per inch, 110.

Run the doubler and ribbon machine just fast enough to keep up with the combers. High speed makes waste and bad work. If the quality is not good enough slow down a little on the cards for the combers.

Spring bottom cans may be needed for the combed work on the combers, drawing and slubbers. There will also be a little less twist on the combed work, it being nearly all one length staple. The ends on the drawing may

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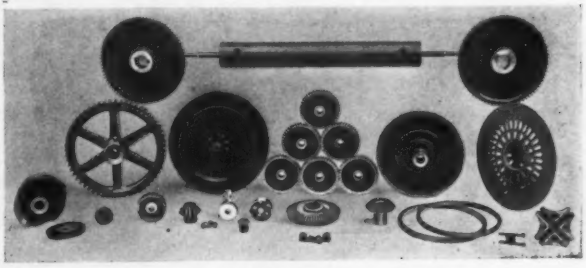

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sag a little on the combed work, if so, change the calender gear and tighten them up.

If strong yarn is desired it is not a good policy to beat the cotton too much, as it weakens the fibers and makes the laps fluffy, somewhat like run-over waste.

If "V. F." has a Kirshner beater on the intermediate picker (which he has), and also one on the finisher picker, it is too much picking. If the finisher picker is a 2-blade I would not beat the cotton over 40 beats to the inch, and less would be better. Usually the Kirshner 3-blade beater is run on the finisher; a 2-blade on the breaker after the cotton has gone through the vertical cleaners and bale breaker.

T. E. D. (MASS.)

EDITOR COTTON:

As I have handled combed cotton for a number of years, perhaps I can give "V. F. (N. C.)" whose letter appears in the September number of COTTON, the information he desires, namely, the machine layout for Whitin combers.

In the first place we will take up the picker room. I suggest that he take his cotton and run it through the breaker picker (leaving the beater speed about the same) as at present, making a lap weighing 15 ounces to the yard. And then put the breaker picker laps on the finisher picker and with the beater making around 660 r.p.m. (two-blade beater) make a 12 ounce finished lap. You will notice I have cut out the intermediate picker which is not absolutely necessary in making combed yarns.

The lap is then put up to the card, and I would advise the following settings: Doffer to cylinder 7/1000; licker-in to cylinder 7/1000; back plate to cylinder 34/1000; top of licker-in screen to half circle 12/1000; middle bar of licker-in screen to licker-in 12/1000; back of licker-in screen to cylinder 34/1000; bottom mote knife to licker-in 10/1000; top mote knife to licker-in 10/1000; cylinder screen to cylinder 34/1000; cylinder screen to cylinder 34/1000; cylinder screen to cylinder 34/1000; cylinder screen to cylinder 34/1000; feed plate to licker-in 10/1000; licker-in cover to feed roll 34/1000; bottom front plate to cylinder 34/1000; doffer cover to bottom front plate 34/1000; top front plate to cylinder 34/1000; flats to cylinder from back to front of card 10/1000, 10/1000, 7/1000, 7/1000, 7/1000; flats to top front plate 34/1000; flats to back plate 34/1000; doffer comb to doffer 10/1000; top flat comb to flat 10/1000.

These settings will produce very good work and are good for all American cottons. The card should be made to deliver a 48 grain sliver.

The next process is the sliver lapper. I have been running a lap weighing 375 grains and the ribbon lapper 450 to 460 grains which gives a draft of 3.33 to 3.26.

I might go back to the cards for a moment to say that with a speed of 175 r. p. m. on the cylinder and 8.50 r. p. m. on the doffer, running second grade peeler, will produce 425 pounds per card in a 55-hour week. First grade peeler and 7.50 r.p.m. doffer speed produces 375 pounds per week, and third grade peeler with 10.50 r.p.m. at the doffer produces 525 pounds per week. All lickers-in should run at the same speed, 450 r.p.m.

Proceeding now with the combers, it must be determined the amount of waste or noils to be taken from the cotton and the comber set to deliver a 52-grain sliver.

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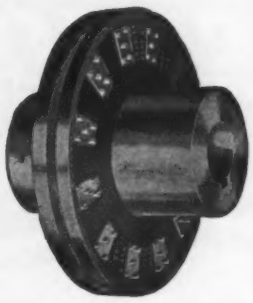

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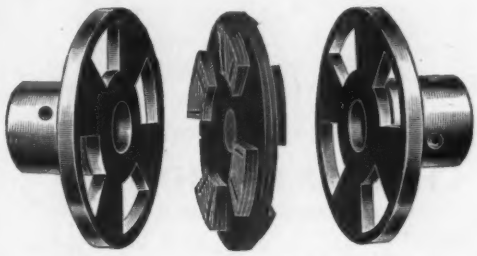

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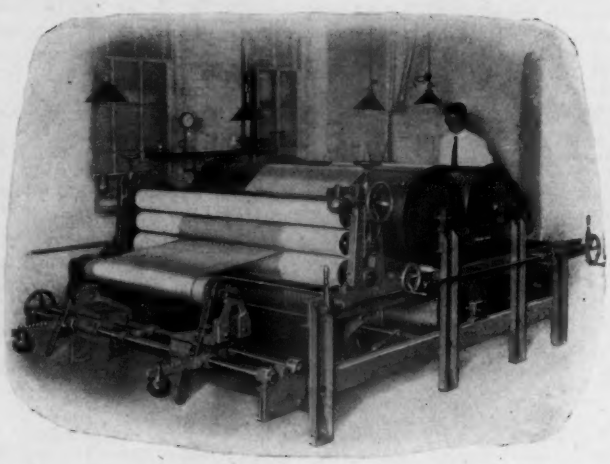

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The drawing could be run about 48 grains per yard on the finisher.

For filling yarn a .90 hank slubber roving, and a 2.25 hank intermediate roving, making a 6.00 hank finished roving is about right for 30s or 40s spinning.

If these rules are followed "V. F." cannot go far wrong with the combing, and as a matter of fact a little experimenting is necessary anyhow to get just what is wanted.

I have had experience making fine yarns and sewing cotton for the best trade and have been running about this same principle for years. I hope "V. F." finds this information useful, and perhaps some other reader will send in his idea on this subject. CONTRIBUTOR No. 358.

Why the Yarns Are Uneven.

EDITOR COTTON:

Replying to "Contributor No. 6203," I will gladly furnish my views as to uneven yarns. I want to say in the beginning that there are so many things which can cause uneven work on the numbers he is running, I can only give the worst which he has to contend with.

First, his two grades of cotton will cause uneven numbers, but I would suggest, if he has room to do so, that he open up five bales of his good cotton and five of the bad, as he calls it, a day, or two days ahead of his run, or longer if possible. Or, if he can only take the ties off and allow the bales to relax, as it were, or puff up, then when he works this cotton run it separately, making breaker laps out of them, and instead of mixing at the hopper, put on two laps of his good grade with two of the bad grade on the apron of his finisher picker. In this way he will get a much more even blend at the mix.

We must all remember that mixing cotton in a hopper is impossible, and is as dangerous as trying to feed scavenger waste, in armfuls at a time, with good bale cotton. They will not feed the same. One will be sure to feed faster than the other and cause uneven drafting and roll setting. But if these two grades are worked separately into breaker laps, being sure to watch and weigh the breaker laps to see that they are as near as possible the same weight per yard, then when they are doubled on the finisher and then fed into the feed rolls, the beaters will mix the stock thoroughly. The finisher beater should now be set to ⅛ inch to the feed rolls if it is a carding beater, as this contributor states. I would then change the front beater in this breaker picker and put in a carding beater there and take the 3-blade beater out, but would leave the back 3-blade beater in. However, I would cut the speed on this back beater to 1200 r.p.m. and set it to ⅜ inch of the feed roll, and the front one to 3/16 inch after changing it to a carding beater.

"Contributor No. 6203" does not mention the time he is taking to make a lap, but if he can make a lap in not less than four minutes on his breaker and from five to six minutes on his finisher picker he should do good work, providing the pickers are set properly to make an even lap, yard for yard. A good way is to unroll a breaker lap, look for thin places and weigh it yard for yard, and do the same at the finisher. If they are not even, find out the cause and remedy it.

First of all, notice the way the picker room is preparing the work, for the doublings are limited. This contributor admits he is using single roving in the spinning

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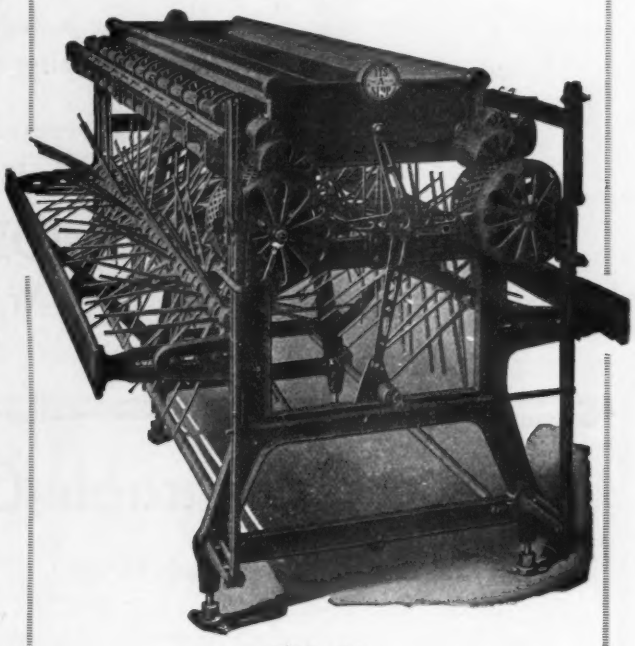

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and his 14s are made from slubber and speeder roving, so here he loses another doubling. I must say it is not the drafts which are causing trouble as much as other little things. For instance, if he is working his card strips and scavenger roll waste over, he should be sure to see that it is fed in evenly with his other stock, or he will have a big variation from this cause.

"Contributor No. 6203" mentions the fact that all of his front rolls are solid, on his fly frames. He most assuredly is getting some very uneven work from them, for the simple reason that it is impossible to get two cots on every roll the same thickness, and they will not lay level on the roll, the steel roll, and every traverse of the traverse motion will cause the roving to draft in bunches and cause the yarn to be lumpy, thick and thin places, as they are called, but not necessarily long light and heavy places. There are two kinds of uneven yarn, one called thick and thin places, and this is mostly found in one yard after another on the same bobbin all along. In this case this unevenness can be traced to roll cutting or rolls not set properly for the length of cotton; or there is a worn gear or broken tooth, or something happens about every revolution of some roller on some process. The other unevenness, as it is sometimes called, is a variation in number being spun where, when sizing the yarn, there will be found a variation of say from one to two numbers of yarn, which is a very much finer or coaser thread than should be. In this instance the cause can be traced back and probably found in singlings, or doublings, or laps skewing up on the cards, making light yarn, or cotton poorly mixed, such as has just been discussed in the foregoing paragraphs.

I merely mention these different unevennesses because they are caused from two entirely different troubles, and if the unevenness is of the nature first mentioned, that is shows thick and thin places of a short length, or about the nature of this contributor's drafts on the different processes, then it is in the rolls; or if something pertaining to the preparatory processes, then they are not functioning right.

I will say this to "Contributor No. 6203"—as I do not know the condition of his machinery and in what repair it is—there are so many things which will cause unevenness, that on his numbers, taking for granted that his speeds are not too high, if he will watch his pickers, as I have mentioned, and change the solid front leather rolls and put in shell rolls or ball bearing front rolls, and keep his cards sharp, he will find a big improvement in his yarn so far as evenness in every way is concerned, and also in breaking strength. As this contributor's drafts are not the trouble, it is going to be somewhere in the range I have mentioned.

First, he should start in the picker room. His laps are not too heavy; they are all right, but he should get after the mixing. See the beaters; get the speeds right; put in the carding beater; take out the 3-blade in front on breaker. Now look for heavy and light work in the laps; take out all the short cotton possible in the card strips. See that every part of the cards are ground and set properly; and the cylinder and doffer ground until they are sharp, for a dull card will cause uneven work and very bad running spinning. I want to say right here that a dull card is going to produce more bad work, even if it is properly set, than a card that is sharp all over and poorly set. In other words, there are so many people who think the set-

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ting has all to do with the condition of the yarns spun. I want to say right here that it takes sharp card wire to do the work, regardless of its setting, to get good work, and if this contributor will go over his picker room and cards, as before mentioned, and see that all those things named are righted and he has the proper lay and twist in his rovings, I don't think he will have to bother his drafts, providing his speeds are not too high. As I said in the beginning, there are many things that cause uneven work, and not being able to see his mill, I am saying just what I would do if I were in his place and furnished with what I needed to do with. I trust what I have said will be of some help to this contributor in his problem.

J. F. (ALA.)

EDITOR COTTON:

In answer to "Contributor No. 6203" I will say, that as a rule, very few mill men consider the diameter of a beater in determining the proper speed. A 3-blade beater, 18 inches in diameter, should revolve 900 to 1,000 r.p.m. A 2-blade beater, 16 inches in diameter, 1,150 to 1,250; and a 2-blade beater 14 inches in diameter, 1,250 to 1,350 r.p.m.

From the foregoing, "Contributor No. 6203" should see that a speed if 1,485 r.p.m. is much too high. If he will govern himself by the speeds mentioned I can assure him that the results will be surprising.

Cotton under 1 inch in length should not be struck more than 40 blows to the inch. I can assure this contributor that the beaters in the breaker picker are injuring the stock. This speed should be reduced at once.

According to my judgment, the card sliver of 48.5 grains is perfect.

"Contributor No. 6203" missed a most important point when he failed to give the finished drawing sliver. If possible, the finished drawing sliver should not exceed that of the carded sliver, or 48.5 grains. .68 hank is about right on the slubbers.

As regards doubling, the .68 hank slubbing to make a 2.00 intermediate roving is okeh, but to make 1.00 hank roving is a mistake, for the reason that in the first case he drafts almost six, while in the second, the draft is too short and the second roll is the cause of unevenness, for the reason that such a short draft allows it too much freedom, and for this reason will allow heavy places to pass its action.

The whole trouble in this case seems to be short drafts. Cut the draft of the intermediate down to about 5 and draft more on the spinning frame. Make about a 1.70 hank on the intermediate and this will call for a spinning draft over eight, as it should be.

The trouble is not in solid rolls. Solid top rolls always made better work than shell rolls. I have made the test many times, and found the solid rolls best in each case.

However, in closing, I wish to point out to "Contributor No. 6203" that if the web on the cards and on the drawings are as they should be, that the trouble is in a high speeded beater and short drafts.

WASH (R. I.)

EDITOR COTTON:

In answer to "Contributor No. 6203," I wish to give the following line-up that I used when I was on numbers from 10s to 16s and around ⅞-inch cotton. Breaker laps weighed 18 ounces per yard; intermediate laps, 16 ounces per yard, and finisher laps, 13 ounces per yard. Sometimes they, or I, would pull them down to 12½ ounces per yard, and sometimes I have pulled them down to 12 ounces rather than change something else.

Now the speeds in the picker room were as follows, as well as I remember, and for which I have any memoranda: The first beater, a 3-blade opener beater, ran about 1,150 r.p.m.; the next, a 2-blade beater, ran about the same on the front of the breaker picker. The intermediate, a 2-blade beater, about 1,150 r.pm. The finisher picker beater ran around 900 to 1,000 r.p.m. This was a Kirschner beater, or spiked beater, as they are sometimes called. And the cards made a 56-grain sliver; the first drawing made 58-grain sliver; the fine or finisher drawing made 61-grain sliver and the front rolls made 310 r.p.m. On the slubbers we made a .64-hank roving; on the speeders we made a 2.00-hank roving, with a little extra twist in the roving, enough for it not to stretch and break back at the speeders and the spinning.

In the spinning we had about a 7.00s draft, and the proper amount of twist to run well at the weaving.

Now about the solid rolls of the fly frames, I have had no experience with these, neither do I care to have any, the reason for which must be imagined by the reader at this particular time, anyway.

The first unevenness that could be noticeable on this contributor's line-up would probably be in his failure to have only two processes of picking. I have tried the two processes on coarse work and find that I cannot get away with it as easily as on fine work, say, around 6.00-hank roving. This, of course, has the intermediates, the jack speeders and the doubling in the spinning. I assume, of course, that the twists are around standard.

The speed, as well as the tension, has a prominent part to play on the fly frames. The higher the speeds, the harder it is to get a uniform tension on the frames. The builders' catalogs will show the proper speeds and also the proper amount of twist suitable. Of course there is some variance from those speeds, but not much.

The oiling of all top rollers is a very important thing in order to secure an even yarn. Good leather top rollers are also included. Frequent and necessary card stripping is very important. Cards should not be run over four hours without stripping. A vacuum stripper is preferable, as this will keep the card teeth sharper and will run longer without stripping, which means more production.

T. A. D. (GA.)

HAROLD R. TURNER, head of the designing department of the Dunean Mills, Greenville, was made overseer of weaving succeeding Mr. Laurens, and R. T. McWade succeeds Mr. Turner.

U. S. HENDERSON has become superintendent of the Latsch-Hazlewood Mills, Munford, Ala.

DOUGLAS WILLIAMSON has been made superintendent of the American Net & Twine Company, Blue Mountain, near Anniston, Ala.

R. C. SIMPSON has become overseer of weaving at the Pepperell Manufacturing Company, Opelika, Ala. He formerly held a similar position at the Arcade plant of the Aragon-Baldwin Mills, Rock Hill, S. C.

CHARLES E. GRAY has been promoted to overseer of spinning, spooling and warping at the Franklin Cotton Mills, Concord, N. C.

Knitting Section

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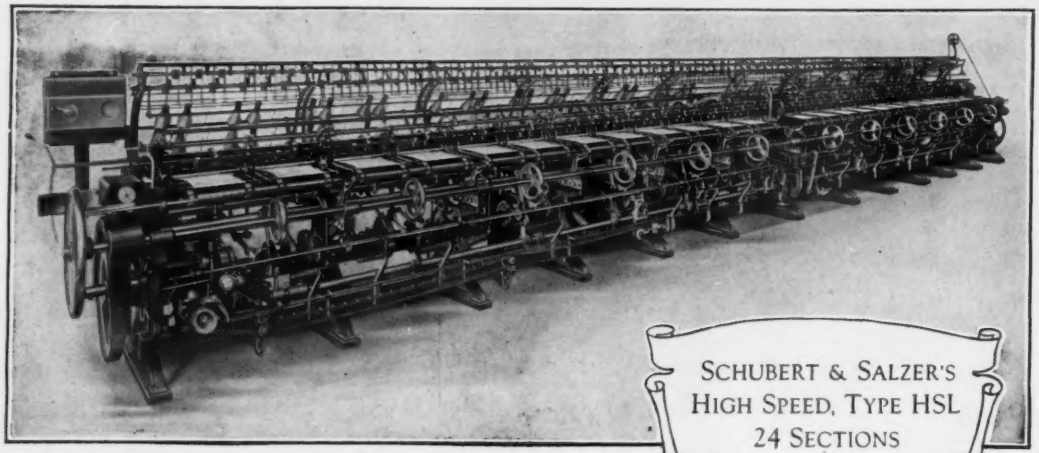

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Finishing Hosiery*

BY. B. D. GADDY, SUPERINTENDENT,
KNITTING DEPARTMENT, GOLDEN BELT MFG. CO.,
DURHAM, N. C.

The short skirt and bright colored hosiery vogue has brought about many changes and many new problems in the finishing of hosiery.

Finishing has moved up from a place of secondary importance to a position of first rank in the manufacture of hosiery. With the various fabrics and numerous shades to be dyed, the dyestuff manufacturers have been called upon to produce a greater variety of dyes, the dyeing machinery manufacturers have felt the demand for more scientifically designed dyeing machinery. The dyer has had to increase his knowledge of dyes and chemicals, and the finisher has had to provide new methods and new equipment for handling an increased amount of finished stock. With all these changes, progress is being made, and the finisher who is not making improvements is not keeping abreast of the times.

One of the new problems, in connection with finishing, is the proper care of the greatly increased amount of stock which has to be carried on account of the great number of shades. If this stock is laid out in the open, exposed to the air, dust, and sunlight, it depreciates very much. Dark, dust proof stock rooms, or well built cabinets should be provided for this stock. Another remedy and probably the better one, is to dye against orders and keep the stock moving, thereby reducing the stock to a minimum, and at the same time reduce the cost of redyeing and refinishing obsolete shades. The problem of redyeing and refinishing obsolete shades is a very delicate one. The best results to be had are not altogether satisfactory. Goods which have been stripped seldom dye the correct shade and they lose much of their former strength, feel and luster. The better method is to convert them into darker shades as taupe, gun metal, and black.

The quality of the finish does not begin in the dye house but goes back to the knitting department, then to the purchasing department. If the purchasing department does not buy standardized uniform raw materials, they need not expect a standardized uniform product to be turned out by the finishing department. For example: Every dyer knows that yarns of different mercerization dye differently. If more than one mercerization is used, the grey stock should be kept separate in the knitting room. Then there should be standardization in the knitting of the hose in minute details, even down to the temperature of the room. In cold weather if the windows are not weather-stripped, the machines next to the windows will knit tighter and make more seconds. The small belts that pull the machines should be kept in condition to insure uniform speed of the machines, as variable speeds will produce a variable fabric. Many other similar small details should be regulated.

The same standardization should apply to the labor. There is usually some method decided upon as the best manner of doing a job, then the job should be done that way. For instance, if it is decided that the knitter can do better inspecting on her right hand than on her left, then all the knitters should inspect on the right hand. A standardized uniform product is always received favorably by the trade. This is one reason why such articles as Arm & Hammer soda and Bull Durham smoking tobacco have been such popular brands in their respective fields.

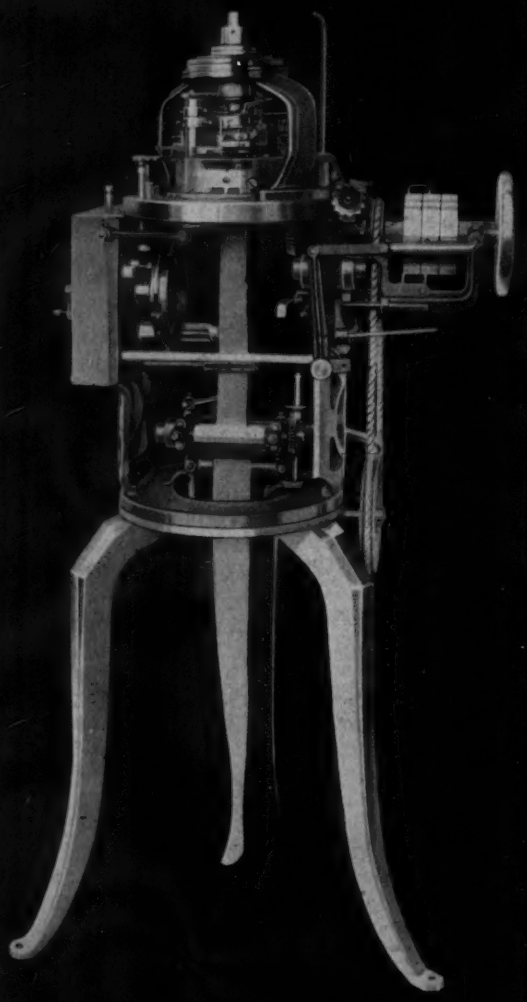
Finishing is so closely interlocked with knitting, the two cannot well be separated. A stocking must first be correctly designed and constructed to look well when it is finished.

The knitting department bears a close relation to the dyeing. The stock must be kept clean and free from oil spots. The most of the redyes comes from oil spots. Someone in defining lever power said it was a 14 inch monkey wrench in the hands of a fool. Redyes could be defined with equal truth as "A pint oil cup in the hands of a fool."

Fresh knit stock as a rule finishes better than old stock. This is especially true of silk goods. If the silk stock is stored in the grey for a long period, the oils in the silk will oxidize and turn the silk yellow. If this is dyed with fresh stock two distinct shades will be the result. There are other advantages in keeping the finishing close up with the knitting, such as keeping the knitting room advised of the various defects in the stock. When the knitter has completed his job, we come to the various operations of finishing. The first and most important is dyeing. Contrary to all practice, the dye house should be so constructed that it could be kept as clean as any other part of the factory. Every dye house should have an ample supply of clear, soft water. Water softner equipment is strongly recommended. The best dyeing machinery equipment should be provided. Every dye house should be provided with sufficient laboratory equipment for matching shades, and testing dyes and chemicals. A careful study of dyes must be made, and a thorough knowledge of the character of the dyes being used is necessary, if the best results are to be obtained. The successful dyer is never satisfied with present accomplishments, but is striving all the time to improve his formulae.

There are two methods most generally used for dyeing silk hose. One is known as the one bath method, and the other the two bath. In the one bath method, the dyeing and degumming is done in the same bath. The advantage claimed for this method is reducing the time the goods are run in the machine and the slight scroop effect on the goods by the small amount of gum left in the goods. Due to the presence of the gum and degumming oils or soap in the dye batch, the bath is harder to control and the addition of shading colors is far more hazardous, and uniform results in the duplication of shades is much more difficult in the one bath method. The gum in the fabric during the dyeing prevents a thorough penetration of the dyes. The removal of the small amount of gum left in the goods when laundering removes some of the dye with it, causing the color to bleed. With the two bath method, the gum is first removed, and the goods thoroughly rinsed, to remove all the degumming agent. The dye is entered in a fresh neutral bath, which is always uniform and easy to control, this makes the addition of shading colors an easy

*An address before the Southern Section of the American Association of Textile Colorists and Chemists, Greensboro, N. C., January 22nd.



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task. These, and many other reasons, might be mentioned in favor of the two bath method. The modern dye machine is constructed to dye either with or without nets, but the protection the nets give to the goods when handling to and from the dye machine and extractor, is of much value. The nets also permit the mixing of sizes in the same pocket which is necessary for a full loading of the machine. The most popular size net is 24 x 24 inches and should be woven of soft twist thread.

The next operation after dyeing is hydro extracting and too little attention is given to this simple operation, for the way the goods board and the way the goods retain their shape depends much on the amount of moisture left in the goods at the extractor. The amount of the time the extractor should run should be varied to suit the size of the batch and the weight of the goods. It is much better to leave the goods too wet than have them too dry. To get the best results the batch should be boarded as soon as possible after extracting.

Then comes the boarding, a small operation but the manner in which it is done contributes a great deal to the appearance of the stocking. The average stocking boarder is just a machine with a certain stroke. He pulls them all alike whether they be loose or tight, long or short. He is not so far wrong at that, if his stroke is right, for the stockings should be knit to fit. The only place to properly regulate the size and length of a stocking is at the knitting machine. A stocking adjusted to fit the board is only a temporary job. Too much heat on the boards will affect the finish of the hose and cause them to shrink when taken off the boards. For this reason each boarder should be given sufficient boards to allow for slow drying.

After boarding, the hose enter the finishing room proper, where the human element plays the greater part. Considerable care should be taken in the selection of the help for this department. A certain precision is necessary here if clean cut merchandise is turned out. Such precision calls for close application and serious thought, which eliminates the frivilous or careless school boy. Young women who are bordering on, or have entered the old maid age are to be preferred.

The old fashioned finishing room equipment consisted of a few rough tables strung along the walls and some empty yarn cases and a few extra case heads to lay the work on. The finished stock was piled at random about the room, which gave the room very much the appearance of a crazy quilt. We have now learned that the psychological effect of a well ordered room will lend much to the character of the product being turned out. The modern finishing room has a place for every thing and every thing is in its place. Well constructed and highly polished work tables are provided and such portable equipment as is necessary for the movement of the stock.

The first operation after leaving the boarding room is mating, which is the most interesting of all the operations. Here the defects of all the previous operations are culled out. The mating of a batch of goods is to a hosiery manufacturer like a child opening a Christmas package. He sees what he has and experiences the same pleasures or disappointments. It brings the pleasure of work well done, or the disappointment of failure.

The "mater", when she has completed the batch, counts the various grades and assigns them to their respective

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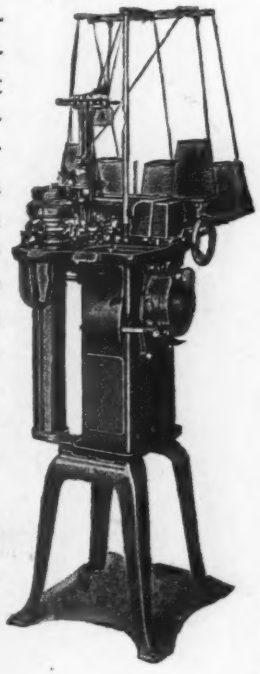

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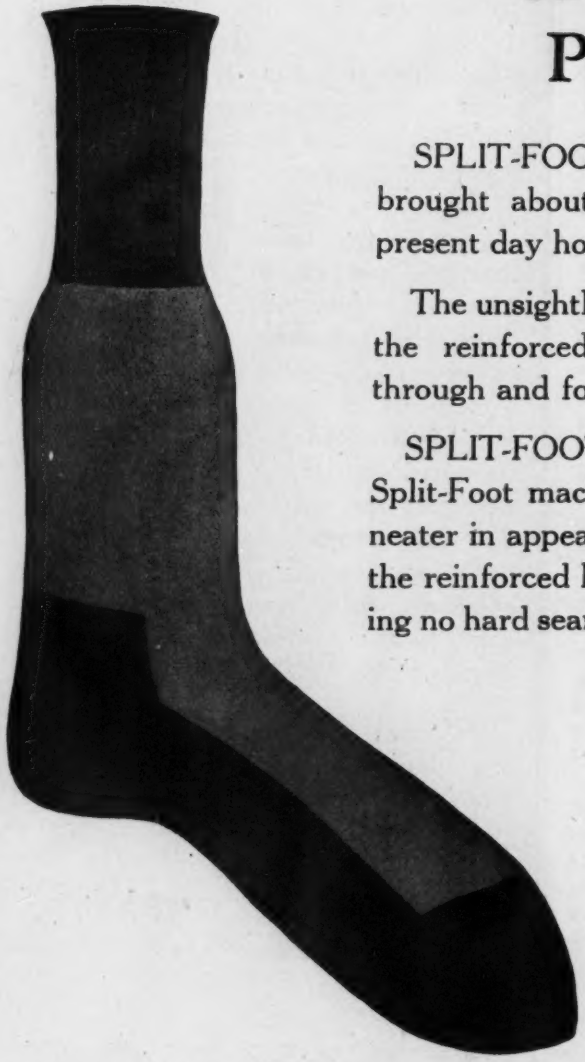

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places and then makes out her detailed report showing just what the batch contained in firsts, seconds, mends, waste, redyes, etc. These reports tell the story of what is being accomplished by the combined efforts of the whole organization, and should be carefully studied by the heads of all departments.

The mated stock passes to the stamper where the dressing up is done according to the order of the customer. The size and toe stamps, or stickers, placed on the foot, and the color combinations of the riders lend much to the appearance of the hose.

Following the stamping, the goods are folded and boxed. The box plays an important part, and in a measure is an expression of the character of its contents.

Experiments and Research in the Raw Materials for Knit Goods

By WILLIAM DAVIS, M. A.

The past year has been characterized by exceptional activity on the part of the various textile research associations and the textile departments. Most of those associations have now got fairly well into their stride and they are becoming adequately staffed and equipped. Many of these research men had little or no practical acquaintance with the industry and they had to proceed rather warily and certain activities had to be curbed or corrected by practical manufacturers who control the research work in those institutions. The output of special research papers for open publication and those issued privately to subscribing members shows a steady increase.

In the realm of fiber research, there is noticeable a greater spirit of cooperation with the experts of the various departments of agriculture and animal breeding for work on the wool fiber, while agriculturists at home and abroad are showing an increasing disposition to tackle the problems of successful cotton growing from the point of view of the practical needs of the industry.

In wool research some of the most striking contributions to the literature of the wool fiber have been made by a promising investigator in an Agricultural College in South Africa. He has added considerably to our knowledge of the growth of wool at various stages during the fiber development, these stages being illustrated by excellent diagrams which arrest the attention of the student. This investigator has also studied closely the causes of kemp in wool and all stages of these mal-formations in fiber are set out from root to tip. The literature regarding the exact form of the medulla has also been greatly extended. These clear and transparent fibers resist dyestuffs, but this has been shown to be due to the presence of air in the central medulla and when this air is expelled the fibers will dye like normal fibers. How to get the air expelled is the question of interest, how to do it economically is a more vital one. One of the most interesting statements regarding this kempy fiber is that it is present at the earliest stages of the lamb period but much of it falls off before the lamb is a few weeks old. This is regarded as a residue of the primaeval state when the sheep was wild and contained a preponderating percentage of those fibers There is one type of kemp which sheds itself every year, while other varieties persist during the whole life-time of the sheep. With these studies have been merged those on the medulla of the wool fiber. This was considered to be pigmented and the direct cause of the yellow tint which is present on many types of wool, but investigation has shown that we must look to some other reason for this tint as the medulla is never pigmented, consisting of specially formed cells and in the older fibers the medulla shows a strong tendency to break down and to become hollow.

The research on some subjects has outstripped the pace of the industry in absorbing those suggestions. As an example of this may be quoted the wool pack in which it was proposed that all Australian wool should be shipped. Wool is at present packed in canvas sheeting which is often loosely constructed leaving many long fibers which get attached to the wool and which hamper the manufacturing processes at every stage. They cannot be satisfactorily dealt with on in the carding machines, nor do they react in the same way towards dyes, so that these fragments reveal a very distinct blemish in the finished state and reduce the market value of the goods.

Recognizing the enormous losses incurred by the textile industries each year by the presence of this vegetable matter, manufacturers and spinners made a number of tests and formulated a scheme whereby a pack should be constructed from wool which being of the same material in admixture would not prove an objection. This wool pack however proved too costly in operation and the farmers wanted the buyers to meet the increased cost of those packs over the jute types and there the matter rests for the moment. The same thing happened in the United States with their farmers some time ago regarding the use of jute twine which shed its fiber amongst the wool which it was used to tie up. The manufacturers in that case supplied stout paper twine for the purpose but the farmers refused to use it, one objection being that it became soft when wet.

Research associations have more recently been engaged in selecting a substitute for the tar which is used by farmers at present to brand their sheep with. This material shows up clearly enough but is is disastrous to the wool as the tar cannot be scoured out and stained whites result. The chemists have now recommended the use of several substances which combine the two essentials of scourability to the manufacturer and indelability to the farmer but it is doubtful whether these results will be seen or acted upon by the sheep owners located as they are in such widely scattered areas.

The dyer and finisher encounters all the defects caused by all his predecessors in the manufacturing routine and one is the use of so-called stainless oils in lubrication of machinery. This material gets on to the goods during their march through the mill and although they may be colorless, they cause infinite trouble in scouring and dyeing as they can only be removed with difficulty, if at all. The opinion has been expressed that the name "stainless" should be dropped as it is preferable to use a type of oil

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which advertises its presence plainly and which is emulsifiable, than one that will leave obstinate spots which resist every scouring and finishing operation and upset the results.

In hosiery manufacture oils and similar substances are employed for lubricating the fiber of wool, cotton or silk as it passes into the knitting needles and experiment has been directed to improve practice in this regard. The ordinary soap and oil emulsion proves rather upsetting of the properties of wool, the fiber loses tensile strength and there is an enormous variation in the elongation so that the widths of knitted articles are varied. Attempts are now being made to provide materials which can be used without heated liquor, with a straightforward dilution having a definite percentage of water and one or two substances of this character are meeting with success as they don't have such a violently upsetting action on the properties of the material.

A number of cases brought to our attention during the year showed the presence of the furniture beetle in the wood from which bobbins and storing cases are made and so numerous have these become that alarm is being felt lest the pest should spread to serious dimensions. This is not to be confused with the clothes moth, for the insect thrives inside the wood, boring passages through it in all directions. On reaching the outside of the wood, its depreciations are often continued through the yarn thus causing enormous loss. These holes are perfectly drilled through the hardest wood and measure about 1/16th inch in diameter. The beetle has six legs and is of a whitish color and the passages are made by the mature beetles not the larvae. If they are found in bobbins, it is important that steps should be taken to destroy these to prevent the spread of the pest into mill floors, skips and the general woodwork of the factory. Many cases have occurred from the London side where these beetles appear to infest the racks on which the goods are stored prior to their being sold. Some manufacturers guarantee their articles mothproof by the impregnating of the goods with a substance called Eulan but this is of no avail against the hard nosed beetle. Formaldehyde is recommended as a fumigating agent but in some cases the remedy has required to be more drastic. nothing less than the rooting out of the entire woodwork of the yarn store being of any effect.

One of the new developments in boll weevil control is the spraying of the cotton plants with calcium arsenate from aeroplanes flying above the cotton fields at a distance of about 20 feet, and in all directions there is evidence of councils of war against the many enemies which endanger the cultivation of raw materials and the storing of textile goods.

The past year has witnessed a new orientation in regard to artificial silk. It has suffered from being overboomed and the public have experienced a certain mild reaction against the metallic luster of the material. It was thought that artificial silk would almost extinguish the demand for real silk but this is not the case for the demand for real silk in the gum is as keen as ever. In fact many developments have been in the direction of imitating closely the filament and the dimmed luster of the real product of the silk worm. The most lustrous types of artificial silk approach an ellipse in cross section and recent endeavors have been in the direction of making the supply nozzle such that the end sections gives a ragged edge or corrugated effect which disperses the light to some extent and imparts a subdued tone to the material. There have also been varying degrees of discharge of the silk. One of the last processes of artificial silk manufacture is concerned with discharging a substance and in one variety the process is called desulphurizing, which allows the luster to shine through unabated. This discharging process has been modified so that a duller effect is secured.

Another variety called "vistra" has been devised with this duller luster and supplied not in long continuous lengths but in shorter fragments after the manner of wool. This can now be spun successfully fiber with fiber at a moderate cost with cotton or with wool and results in quite attractive effects which are used for underwear. Earlier experiments in this direction were made with the waste from ordinary artificial silk, but when chopped up these proved to be too brittle and as they snapped off readily and the tiny fragments became lodged in the apertures of the needle latches of the knitting machine. Another type of fiber is made with a hollow center which gives the material greater bulk of handle compared with the weight. This makes it more suitable for summer goods where the lustrous appearance is desired but where less weight is wanted. Former experiments in this direction showed that the inner opening so formed became filled with gases but it is understood that they have now overcome this difficulty so that the fiber is not so notably distended. This variety in cross section is macaroni shaped with the edges corrugated or rough, the materials is warm and lofty in handle and there is a crisp feel approaching that of real silk, although this is accompanied by reduced strength and elasticity.

In the dulling experiments aliminium salts have been used, in combination with the ordinary sulphonated oils applied immediately after dyeing. Other patents have been taken out for waterproofing the material but more important is the process for rendering the material splash proof where the porosity is preserved. In splash proofing the material is treated with a wax which allows the drops of rain precarious footing, while splashes of mud are removed by a light brush.

Knitting Arts Exhibition.

Report from the headquarters of the Knitting Arts Exhibition which is to be held in Philadelphia from April 4th to 8th, indicate that this exhibit of modern mill equipment will be even larger than it was last year. There are a very few spaces left in Commercial Museum and these are rapidly being taken by nationally known firms.

Manufacturers come from all over the East to show their machines in operation, realizing that this exhibition sets the pace throughout the trade. The National Association of Hosiery and Underwear Manufacturers has held this display every spring in connection with their annual convention for 23 years. This long life alone proves that this is an established method of introducing the new mechanical contrivances to the industry, and one to be seriously considered.

Repeating their success of last year, the Association will again hold the annual banquet right in Commercial Museum. This practice was inaugurated last year and made such a pronounced hit with those members of the

Association who had displays and consequently did not care to leave them for any length of time, that in all probability this plan will be adhered to for some time to come.

The various convention meetings scheduled for the week will also be held in the Commercial Museum so that no exhibitor will have to spend more than a minimum amount of time away from his booth. In fact the Association is doing everything within its power to make the exhibition more efficient so that the greatest amount of business possible can be done during the five days that the show will be open.

All inquiries regarding space should be directed to Chester I. Campbell, general manager, 329 Park Square Building, Boston, Massachusetts.

Dyeing Union Shades on Hosiery Containing Rayon, Pure Silk and Mercerized Cotton.

BY CHARLES B. ORDWAY.

Union dyeing on three-fiber hosiery, that is hosiery containing rayon, pure silk and mercerized cotton, is a novelty proposition, particularly applicable to infants' hose. The Spalding Knitting Mills, of Griffin, Ga., is one of the few mills in the South making children's and infants' hose exclusively, and Charles B. Ordway, of this company, discussed this subject of union dyeing at the Charlotte meeting of the American Association of Textile Chemists and Colorists. His remarks follow in part:

When I arrived at my present position they were making an infant's hose containing viscose type rayon top, Japan silk leg, and mercerized heel and toe. They were having great difficulty in maintaining the same tone on all three of these distinct fibers. The rayon top and silk leg would be a union shade, but the cotton heel an off shade, or vice versa. This showed that the formulae were not worked out correctly as to temperature, rate of exhaustion, and affinity of the dyestuffs for the three fibers.

I then tested over a hundred dyestuffs at temperatures ranging from 170 degrees F. to 210 degrees F., on this hose in a 1-20 bath with and without the addition of Glauber or common salt to the bath before I started matching the shades, keeping all the dyeings properly marked as to the results for rate exhaustion, affinity, and difference in tones, and the amount that the neutral dyeing colors stained the rayon and cotton.

All shades possible were matched, using Direct Silk White and neutral dyeing colors. Those colors showing the slowest rate of exhaustion gave the best results.

The yellow shades were the most difficult, as direct yellows have a great affinity for mercerized cotton, leaving the rayon a light off shade. Using Stilbene Yellow, Metanil Yellow and Azo Yellow, I split the boiled-up color in two equal portions, entering one part and the goods at 140 degrees F., bringing it up to 205 degrees F., in twenty minutes, adding 10 to 20 per cent common salt, running twenty minutes at 205 degrees F., adding an equal amount of salt and the rest of the color and boiling twenty minutes longer to obtain the shade desired.

My object in using Metanil Yellow was to stain the rayon top enough to make up for off shade caused by the affinity for the cotton, as it usually boils off the silk when the temperature goes over 190 degrees F.

In case the temperature is not held at 205 degrees F., the rayon top will be a light shade and the heel and toe too heavy to make a good union.

For blues I used Direct Blue RW, 6B, and Diazo Black BH, Pontacyl Blue 5R, Wool Blue N, and Green B in a 1-25 bath or longer bath. Entering the goods at 120 degrees F., bring to 190 degrees F., in twenty minutes, and adding 5 to 30 per cent Glauber salt and holding at 190 degrees F., for twenty to forty minutes.

The formulae, of course, have to be worked out according to the various types of shades that you have on blues. I had approximately ten varying shades in blues, from sky to a very heavy shade like a navy or a medium tone like Yale blue, which has been very popular for the last year or so.

The light tans and browns were matched with the Pontamine catechues in place of the direct browns like 3Gn and GR, as they gave better unions on all the range of shades. Take a range from a light champagne on to a russet brown, french tan or russian calf, or any of the darker shades that the women use. They were dyed by the same method as the blues.

You probably have noticed on these socks that have gone around that the green shade I have there is very bright. I had great difficulty in running that shade because most of the direct sky blues will go on the rayon heavier than on the mercerized cotton, and the direct bright yellows will go on the mercerized cotton heavier; so I found that I had to select the most brilliant Benzo greens and yellows that I could find. I started them at 140 degrees F., and went to 180 degrees, adding 5 to 10 per cent of Glauber salt, maintaining this temperature twenty to thirty minutes. I found this gave me the best results.

I tried every combination of reds that I could find without securing the results desired. The mercerized cotton and rayon would become two different shades on storage. My only remedy was to match the rayon top and silk leg, and trust that the purchaser would not be too critical. Pinks were run in a short bath and heavy shades in a long bath similarly to the blues.

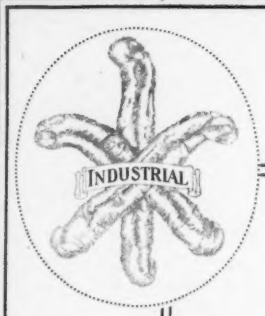
All of these goods were processed by the two-bath method of first degumming the silk, extracting, and entering in the dye bath.

The equipment used consisted of Monel metal lined, paddle machines, the paddles having 12 to 20 revolutions per minute, according to the size of the machine. Water used was of zero hardness, and a steam operated temperature controller gave the exacting temperature required. The various dyestuffs found best after practical production were as follows:

Direct Black LN, Diazo Black BH, Yellow SX or Stilbene Yellow, Flavine S, Red 8BL, Catechu GN, B, 3G, Green MT, Scarlet 4BS, 4BA, Violet N, 3R, Red FD, Orange EG.

For the neutral dyeing colors, Red GD, Red WH, Azo Yellow, Cloth Brown 5R, Blue N, Blue A, Blue 5R, Orange R, Green B, Violet 4BN, 10B and Brown AN.

Of course this is just a brief outline. A subject like this is so broad that no one can cover all topics completely; one can only touch a few of the shades where most of the trouble is caused.



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Why the First Stitch Drops on the Transfer.

EDITOR COTTON:

As an answer to "H. B. (Tenn.)", who asked in "Knitting Kinks" for a remedy for the Scott & Williams H H machine dropping the first stitch on the transfer, I will quote the following from the instructions of the manufacurers:

"The cylinder needle under the first high butt dial needle sometimes needs bending slightly backward and to the left to make it take the stitch in the transfer."

I trust this will be of help.

CONTRIBUTOR NO. 1030.

EDITOR COTTON:

In answer to "H. B. (Tenn.)" whose question with reference to trouble with the Scott & Williams H H machine, 240-needle, was published in a recent number of COTTON.

The peculiar trouble with the H H machine is the dropping of the first stitch on the first needle owing to the slack thread with nothing to hold it firmly. It is well to see that there is no play in the gears or in the dial shaft. Any lost motion has a tendency to cause drops.

One of the most important points is the speed of the machine. He should see that the machine is running at the specified speed for H H machines.

I have found it necessary to bend the first needle a trifle where the transfer starts, but not enough to make a wide line in the hose. This has overcome the drop in most cases.

"H. B. (Tenn.)" did not state what yarn he is using, and this has a lot to do with the success of proper transferring. Generally speaking, I suggest that he take out whatever play he can find, and try bending the needle a trifle, and then let us know what success he has.

BOB (CANADA)

EDITOR COTTON:

In the December issue of "Knitting Kinks," "H. B. (Tenn.)" asked "how can a Model H H machine be prevented from dropping the first stitch on the transfer?"

This question as asked would indicate that he is having trouble only with this one stitch and that all of the others are all right. The reason the first stitch is always the most difficult to transfer is very apparent. Every dial needle has a stitch on at this time. Number one high butt is the first dial needle to transfer. It comes out to transfer the stitch that it holds to the cylinder needle. The last low butt dial needle remains back in the dial, which causes the stitch on number one high butt dial needle to be held back and consequently very much narrowed, due to the necessary stretch between these two needles in these extreme positions. All of the other dial stitches are more or less round and also more open, because the preceding dial needle, instead of being back in the dial, is out ahead of the stitch that is being transferred and naturally helps to open it rather than narrow it.

The only thing that I find will make the first stitch transfer properly, in these difficult cases, is to bend the cylinder needle, which comes under number one dial needle, back toward the center of the cylinder, and also slightly toward number two high butt dial needle. The exact amount to bend this needle will have to be determined for each individual machine that is giving this trouble.

CONTRIBUTOR NO. 1032.

Why the Stockings Chafe.

EDITOR COTTON:

In my opinion, the roughed or chafed condition of the silk hose described by "Contributor No. 1008" in the November issue of COTTON was caused by what is termed "tendering" the material, and wherever this hose comes in contact with the net, or with any of the other hose, while undergoing de-gumming, the chafed condition would result.

I am of the opinion that even though the temperatures were reduced with his present de-gumming oil, he would have this condition to some extent, for it is my opinion that the material he is using for de-gumming that is causing a chemical action and the temperature is merely assisting that action.

It may be of help to know that I have had this condition in some mills using a percentage of soda ash, in addition to the de-gumming oil, and wherever I have observed this particular tendering it has been where soda ash or caustic soaps were being used, together with the oil. I have found that an emulsifier used in the de-gumming process

that has no chemical action results in no tendering.

CONTRIBUTOR No. 1036

EDITOR COTTON:

I wish to say that we used to have rough or chafed spots on silk hosiery in the dyeing and de-gumming similar to the difficulty described by "Contributor No. 1008" in the November issue of COTTON. This ended, however, when we installed a system for using dye nets. With this plan the nets are grouped into similar shades and it has been found entirely practical after several years to bag all silk goods in this way. The roughed up goods are thus eliminated.

I know of one other mill which claims to have avoided this difficulty by a special smoothening up of the machines, and I have heard that some places get around this difficulty by de-gumming and dyeing the goods wrong side out. We have considered all of these, but bagging up was chosen as the most efficient and most practical method for preventing roughness.

CONTRIBUTOR No. 1035.

Is the Trend Changing?

EDITOR COTTON:

Flappers are to be flappers no longer. Gone are the days of the masculine garbed women and the young women which are believed to have been favoring the "alluring" clothes are among those who have passed on to "greater things." In its place has come forth the demure Southern and prim New England types; the one garbed in the dainty feminine attire of the South; while the masculine woman type which has been coming from New England in her boyish bob, high necked dress with stiff linen collar and silk scarf, promises to give way for the more elaborate type of garments.

What is this going to do to knitted garments and silk hosiery ask factors of the knit goods trade? School girls from the South have already made their decision, voting unanimously in favor of doing their share to help "King Cotton" and boost the cotton market by wearing cotton hosiery, cotton undergarments and cotton dresses.

Young women from New England have done likewise, and have declared their intention of doing their part to help home industries and to sell the wool that is sheared from the sheep of their fathers and wear woolen and worsted hosiery for both summer and winter, although are noncommital about their underwear. Now silk men are scampering about preparing new lines of practical models which they believe will appeal to those who have shown a preference for the mannish type of garment, incidentally introducing many new lines of both silk hosiery in plain colors and sports styles as well as athletic suits for women, which they believe will appeal to this type of buyer because they are so practical.

But how will the young women in other sections of the country make their decisions as to what might be needed. Are they also going to adopt cotton hosiery? Many factors believe they will because it is usually the custom to follow in the steps of the young college women and do as they do, say what they say, and wear what they wear, so manufacturers of other types of hosiery had better have a care if they are not going to have some surplus stocks on their hands.

One silk manufacturer declared that silk has never failed to make an appeal to women, and he had no fear that cotton hosiery was going to take the place of silk now or at any other time, although he admitted that women were beginning to get more normal and starting to wear hosiery differently than they have done since silk stockings have been so popular.

This spring they have been buying cotton hosiery for morning and to wear with cotton dresses, silk for evening or to wear with silk dresses, and sports numbers to wear during the day while motoring or engaged in sports of any sort. He claimed they are showing more sense in their purchases and are not only buying a more moderate priced stocking, but are using better judgment in their uses. Of course, he stated this attitude did not work to the good of the silk hosiery trade, since less silk was used when they were worn only for special occasions, but the manufacturer who has been specializing will have to make worsted and cotton lines as well as full fashioned silk.

Added to the change in demand for hosiery has developed a demand for other knitted garments and many specialties have been introduced such as the knitted scarf, shawl, dresses and other things, which more than offsets the falling off of demand, should there really be any change felt at the mills.

This may be a transient notion brought on by the present set of conditions, but it will be well worth watching by men interested marketwise. A. E. (N. J.)

Curing Drop Stitches.

EDITOR COTTON:

In answer to the questions asked by "K. T. (Ga.)" in the October number of COTTON, I will say that these are common difficulties, on the model K, yet sometimes hard to solve.

I have not found any one remedy to stop a machine from making drop stitches on the long butt needles coming off the heel and toe. If the gap closer ring does not close the gap over the throat plate it will allow the latches to close when on the heel and toe, causing the drop

stitches in the ankle line or the looper line. The brush not being set right might also be the trouble. Sometimes by putting on an extra cylinder band, this trouble can be stopped.

Drop stitches in the gore can be caused by a number of things. The upper center cam not pulling the needles down low enough in the corner of the throat plate, allowing the latches to close, and the side cam having nicks in it, are two things that might cause this trouble. The gap closer ring not going entirely closed when on the heel or toe will also cause this.

In either of these first two questions, loose needles or needles out of line would cause the trouble.

The best remedy I have found when the down-pick does not pull the needles down freely on one side or the other is by concaving the down-pick cam as shown by the dotted

line in the illustration. The down-pick being too long on one side or the other will pull the needles out of the slot. They should measure 5/64-inch on each side.

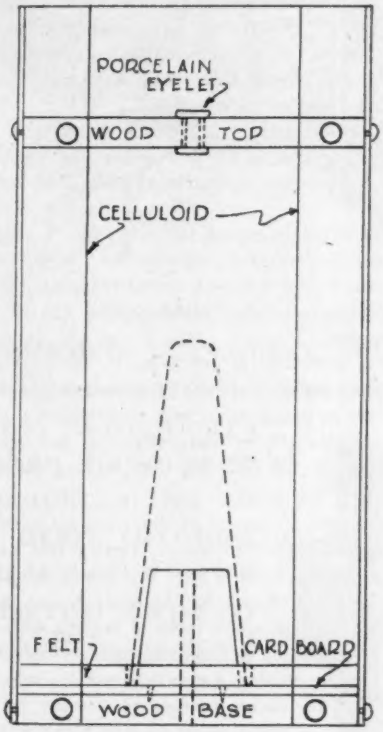
CONTRIBUTOR NO. 1033.

Knitting Rayon Without Oil Treating.

EDITOR COTTON:

Rayon has been and will always be a source of worry for the fixer as well as for the knitter. The chief trouble is due to the fiber being wiry and springy, which causes it to catch on any small object, such as a knot or rough spot on the bobbin or paper cone. The least little jerk will cause it to tear and break, with a high waste percentage as a result.

One of the many troubles a fixer has to contend with in running fancy pattern hosiery made from rayon, is the rayon jumping out from under the yarn binder or clamp, due to the automatic changes from one color to another,



the binder has to raise while the yarn changes in order for the yarns which go out of action to slip under the binder. Then the artificial silk jumps out because it is so wiry.

Many mills have different ideas on the running of artificial as well as pure silk. I will describe some of them:

First we have the rice method, where a pan about like a small bread pan, around six inches in diameter and three inches deep, is placed on the yarn bracket of the knitting machine, and a hole punched in the center of the pan so it can be placed over the pin on which the cone is placed. Then the bottom is covered with rice about one inch deep, and the rayon is set in the pan on the rice. This will prevent the yarn from flying under the bottom of the cone or bobbin when it is being used, but I do not like this idea. While it works all right, it has its faults. When the machine changes to the heel, the rayon is out of action and lies on the rice, due to the drag being released. Then when the machines changes to knit the foot, the rayon going into action with a jerk causes it to throw quite a bit of the rice out of the pan onto the floor. When there is a row of machines doing this the floor is a mess by night-time.

Another plan is to use cotton batting, which is placed under the cone the same as the rice. Even with this, the yarn, when out of action, sometimes wraps around and picks up a piece of the cotton and carries it into the tension discs, which causes the tension to release the drag on the yarn and the stocking is knit too loosely and mis-plaiting results.

Another trouble maker is the wind. On warm days the girls like to open the windows, and the fixers enjoy the cooling breezes as well as anyone else, but the way it blows the yarn around is something terrible.

To get around all of the difficulties outlined, I have rigged up an outfit which is working entirely satisfactorily, and which is shown in the accompanying illustration. I made a cylinder-shaped cage about 15 inches high, of a diameter to fit my needs. I used sheet celluloid so that the knitter can see when to change the cone or bobbin before it runs empty.

I used two wooden discs, *A* and *B*. The bottom one, *A*, is covered with a piece of felt. The other disc, *B*, is fitted with a porcelain eye for the yarn to pass through, and is located just high enough so the bobbin or cone can be placed under it to get the ballooning effect. The circumference of the discs is about 20 inches, and in cutting the celluloid I leave an opening large enough for a bobbin or cone to be slipped through.

I have had several comments from mills on the value of this outfit, and it may help someone else, so I pass it along through "Knitting Kinks."

CONTRIBUTOR NO. 1920.

Needle Breakage; a Cause and a Remedy

EDITOR COTTON:

I will relate an experience we had in the past few weeks in our ribber room which caused us quite a bit of expense and trouble, in the thought that by telling how we solved the problem, I might be of some help to someone else who might sometime have this same kind of a trouble, or a similar one, in putting them on the right track. It is highly probable that exactly the same situation might never exist in another plant, or in our own plant again for that matter, but at the same time, the more a man can learn about the equipment and its mechanical peculiarities, the better fitted he is to take care of them; even if what he learns is not exactly what he wants, it may give him a lead onto the exact cause of his particular trouble.

Some time ago, on our Wildman ribbers, we changed from smaller sizes to larger sizes, now making 8½s on 280-needle, 4¼-inch cylinders, and so on.

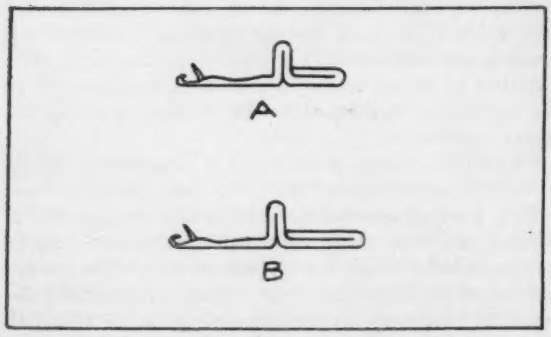
We got along all right on the new work with the exception that we had a tremendous amount of dial needle breakage, and although we searched constantly for the reason, there seemed to be no mechanical cause.

Finally I arrived at the theory that, in the larger cylinders, the same needles we had been using were too short; that the work was pulling down on the needles, and since the larger space gave them more room to pull down be-

cause they were not long enough on the opposite end from the hook or the inside end, this was causing the excessive needle breakage.

To prove out this theory, I endeavored to get from the concern which had been furnishing us needles regularly, a needle with a longer shank. But although I explained my idea to them thoroughly, I could not induce them to make these up for me. Finally, one day, another company's representative called at our mill, and I explained my idea to him, and he assured me his company would be glad to make them for me, and they did, and I am glad to say the change has reduced our needle breakage on the ribbers to a minimum that even looks satisfactory to the treasurer on our reports.

Just what I did is clearly explained in the accompanying sketch, which shows the needles in practically exact size. The one shown at *A* is the regular needle which we had been using, and the one at *B* is the one I had made longer,



and which completely stopped our excessive breaking of needles. The mill man can see that in the larger cylinder, if the large part of the needle is longer, this will give it more body to resist the pull of the fabric, whereas with the regular needle, which is shorter, there is less leverage and it has more play and consequently break much more frequently.

Shortly after I had started using this new needle, the representative of the needle company came around again, and told me of a mill close by which had reported the same kind of trouble, but he hadn't told them what I had done because he didn't know whether it would be just right to let another mill know of it, seeing as how I had gotten up the idea. I told him positively that I would be glad for him to put them onto it, and anyone else, too, because I have always contended that a man should be willing to help the other fellow in every possible way.

H. P. (TENN.)

Kinks and Suggestions on the Model K Machine.

EDITOR COTTON:

While the discussion on Model K machines is going on I wish to add my bit to "Knitting Kinks" by offering several kinks and suggestions applicable to this type of machine as I have found them in my experience. I will begin with a resume of the machine movements.

Machine Movements in Making a Ladies' K Stocking.

The first or rear step link, causes the pattern drum to be rotated slightly by the main pawl, in turn causing yarns No. 2 and No. 5 to drop into the last of the short butt needles just before the high butt needles come to the delivery point. This movement also causes the jackless needles to be rendered inactive by making the auxiliary cam No. 7175 active.

The next movement of the pattern drum is caused by the auxiliary racking pawl No. 7313. This renders the auxiliary cam No. 8387 active on the long butt needles only, causing them also to become active. The next movement is caused by the same means and renders the auxiliary cams No. 7175 and No. 8387 inoperative.

Also the succeeding movement of the cam drum is again caused by the auxiliary pawl No. 7313, which once more causes the auxiliary cam No. 7175 to become active, and this is followed in the next movement of the cam drum, caused by the main pawl, which renders the auxiliary cam No. 7175 inactive and which causes all the needles to again become active. These motions all take place on the first link of the chain, and make the setting up courses of the stocking.

In terms of knitting they are as follows:

The first course is knitted on every other needle; the second course on every needle; the third course on every other needle, during which the transfer jacks are put in operation by jack cam No. 8417, causing long loops to be formed over them for one turn of the cylinder; the fourth course is by every needle and is made by the yarn delivered from the yarn change finger No. 2.

The next movement of the drum is caused by a medium chain link and main pawl, and causes the yarn change finger No. 5 to become operative and No. 2 to become inoperative.

Then the drum is caused to move by a high link which makes the transfer-jack-cam No. 8263 and the auxiliary cam No. 8284 become operative, causing the transfer of stitches from the transfer jacks to the jackless cylinder needles.

The next movement of the drum by the high link and the main pawl causes finger No. 4 to become operative and No. 3 to become inoperative, and at the same time causes cam No. 7175 to render inoperative the jackless needles for 1½ turns of the cylinder, thus making the anti-run-courses.

With the next movement of the drum the stitch graduating device goes into operation. During this period the fashion marks are made. Then two idle kicks are made, after which the next kick by the medium link and main pawl causes the high splice lever to become active. Then a high link changes the motion from rotary to reciprocatory, at the same time causing the switch cam to drop, causing the high butt or instep needles to become inactive by placing them in a plane about ½-inch above normal.

The up-picks then pick up one short butt needle from the active column of needles to the inactive column until 39 needles depending upon the amount of links in the chain at either end of the column, are rendered inactive. Then the down pick is rendered operative by the drum movement caused by the medium link and main pawl. The down pick renders two needles at each end of the column of inactive needles, active, and as the up-picks are still active, the gain is only one needle on each side of the column. This continues until the short butt needles are active, when high link and main pawl change the motion from an oscillating to a rotary motion, at the same time the switch cam is changed to the high position making all the high butt needles active.

The foot is then made, the splicing finger being in

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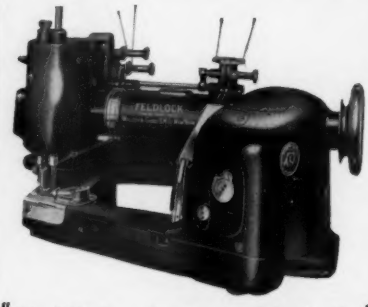

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action. The next movement of the cam drum is caused by a medium link and main pawl which causes finger No. 3 to drop and No. 4 to raise to make the toe guard.

Then a movement of the cam drum is caused by a high link and main pawl and changes the motion the same as on the heel, with the same picker action.

When the change is made off of the toe there is no yarn change, but the heel and toe yarn continues for 12 courses for looper rounds.

The drum cam is advanced by a medium link and main pawl, causing the toe yarn change finger to lift the yarn out of the needles, letting the stocking drop into the box. This brings the machine to the starting position and it is ready for another stocking.

A Principle of the Knitted Stitch.

Machine troubles may be divided broadly, under two heads:

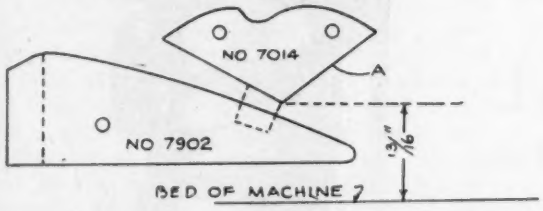
First. Those caused by the failure of any of the different parts of the machine, outside of the needle cylinder and the sinker head, to function properly, which we may call mechanical troubles.

Second. Those caused by the imperfections of needles or sinkers or the adjustment of the needle or sinker cams, which we will class as knitting troubles.

In learning to fix machines, a person with a little study and practice will be able to take care of all the mechanical imperfections without much trouble. But when it comes to the actual knitting, one has to use patience and ingenuity to overcome imperfect knitting. Proficiency in this direction comes only after months of practice, and with an earnest desire to get results.

Since the actual knitting is the hardest problem, we will take it up first.

To begin with, we will take plain knitting, that is, the



leg of the stocking. Cam No. 7014 in the sketch is the left side stitch cam.

The needle butts pass down the surface *A* and on the last part of this surface the stitch is drawn by the hooks of the needles passing between the sinkers. Now the loop must be fully formed on one needle before the needle following begins to form its loop. Failure to do this causes a great deal of strain to be placed on the yarn and this is the principal cause of holes in the tubular part of the stocking.

When the machine is being turned slowly, the loop will be formed in a normal manner, but if it is run at high speed, the inertia of the needle sometimes causes it to leave the surface *A* and then we have two or more needles trying to form stitches at once, causing a strain that the yarn cannot stand, and it will break in weak places.

To overcome this trouble, first, one must see that the cam is perfectly smooth. Second, see that all needles have sufficient crimp at the lower end to give them enough friction between the cylinder walls so that they will stay in contact with the stitch cam.

The opening between cams No. 7014 and No. 7902 must be just enough so that the needle butts will pass through without any play, and this condition should obtain for one fourth back of the lowest point of cam No. 7014 as shown by the dotted line in the sketch.

While the stitches are being formed by the needles the sinkers are all the way back from the stitches, and as the needles begin to rise, the sinkers move forward just in time to cause the stitches to "knock over" on the needle hooks.

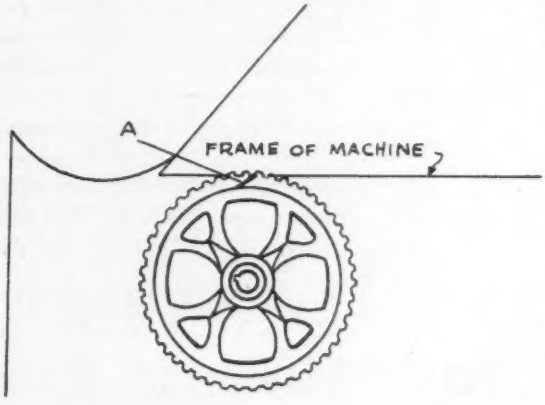
Timing the Gears.

The timing of the gears on the Scott & Williams model K machines is a very important feature and must be understood.

The timing of the plate with the main shaft is the most important.

The bed plate No. 5553, is timed with the gear ring, and the main shaft assembly is timed with segment gear No. 6007 and the high speed gear.

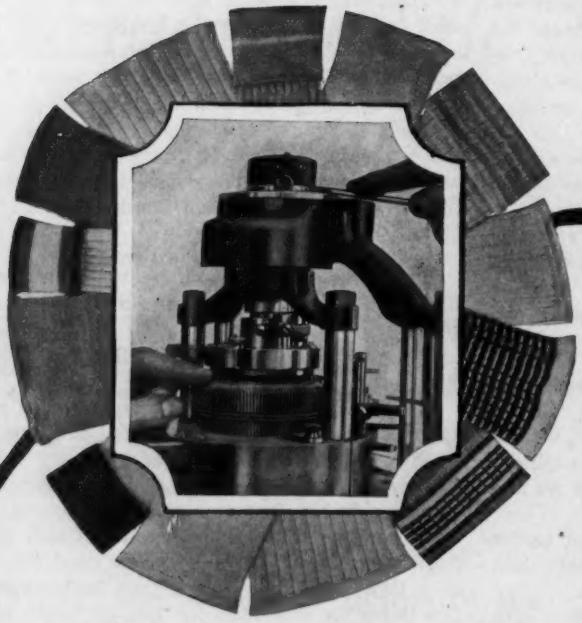
Take for instance the main shaft, which must be taken out for a broken gear or a worn out bushing. This of course disconnects the segment gear and high speed gear from the main shaft. As these two are timed, it is necessary to re-time them when putting them back together. Before taking the main shaft out, turn the handle of the machine until the handle is in the uppermost position. On



the main shaft the left clutch pinion No. 6010 is meshed with the segment gear No. 6007, and the right clutch pinion No. 6013 is meshed with the high speed gear. It will be noted that the left clutch pinion No. 6010 and the segment gear have a zero mark on the left side of each. These two zeros are meshed first. Put on the left side bracket which holds the main shaft in place. Remove the clutch key No. 7000 from the main shaft. After this is done the main shaft can be pulled forward by loosening up the bracket a little which holds the main shaft, loosen this just enough so that the right clutch pinion can be turned around to the position to meet with the zero on the high speed gear. It is a good thing to mark the teeth of the gears that are to mesh, with a light colored chalk, so that they can be seen readily.

The meshing of these gears is at times hard to understand, but once mastered it is simple.

In case it is necessary to time the main shaft with the bed plate, the following instructions should be observed. In order to do this the cam ring No. 5817 and the head of the machine must be removed. Put the machine on a reciprocating motion. Note on the right side of the bevel



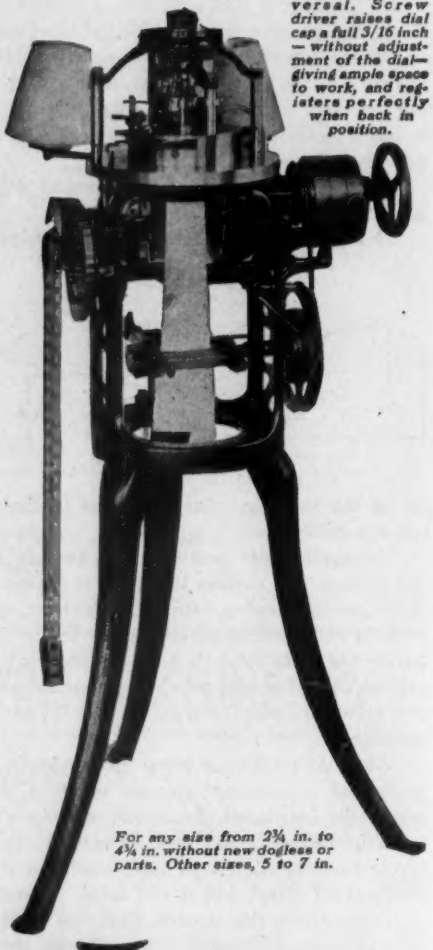
True Ribbed!

HERE is the machine that puts permanent elasticity and snug fit into hosiery tops—and does it at minimum expense. Every part and every motion of the Universal Ribber reduces cost. The dogless has no vibrating parts—repairs and delays are avoided. Free vertical movement of dial makes "picking up" easy.

UNIVERSAL HOSIERY RIBBER

To inspect an entire section of the dial, simply loosen one thumb screw. A loose course plate that reduces needle breakage. Heads are interchangeable without new dogless parts. Take-up gears entirely enclosed prevent oil spots and seconds. One-piece frame increases rigidity. The Universal operates with less noise, less vibration and less attention.

Let us send you some actual operating figures



Note how easy it is to "pick up" fabric on the Universal. Screw driver raises dial cap a full 3/16 inch — without adjustment of the dial—giving ample space to work, and registers perfectly when back in position.

For any size from 2¾ in. to 4¾ in. without new dogless or parts. Other sizes, 5 to 7 in.

FIDELITY MACHINE COMPANY
3908-18 Frankford Ave., Philadelphia, Pa.

120 Broadway
NEW YORK CITY

James Building
CHATTANOOGA, TENN.

THE UNIVERSAL HOSIERY RIBBER

gear No. 6008 there is a mark *A* cut at an angle. Turn the handle of the machine so that when it is making the forward stroke the mark on this bevel gear comes even with the front edge of the frame of the machine. The handle should be facing the front of the machine when in position.

The next move is to mesh the bed plate No. 5553 with the gear ring No. 5933. Notice on the left side of the bed plate there is a zero mark; also a zero mark on the plate of the gear ring. Raise the gear ring and turn it around until these two zero marks are together, then mesh. It will be understood that this is all done while the mark on the bevel gear is even with the edge of the front of machine, as shown in the illustration.

In a later letter I will take up other kinks and suggestions. CONTRIBUTOR No. 445.

Some Reasons for Sleazy Hosiery.

Low prices demanded by distributors are assigned by silk interests as the explanation for much sleazy hosiery that has been causing many manufacturers no end of trouble with their trade. Some of the sleaziness, it is said to have been disclosed in a recent investigation by silk interests, can be charged to ignorance or neglect on the part of mill managements, while a great deal of it is ascribed to design by manufacturers aiming to make the cost of the stocking fit the price many jobbers are willing to pay.

In a conference of experts at which complaining manufacturers reported the difficulties experienced, it was found that whether mills bought thrown silk or silk in the raw state and had it thrown by commission throwers, the results complained of were practically the same. Where ignorance or neglect were uncovered by the investigators, it is stated, the troubles were due to either boiloff in the dyeing or to mechanical defects, changing temperatures having much to do with the imperfect operation of the machines, which in the cases under investigation, were full fashioned. It was brought out also that where there was mechanical defect it was due, in some instances, to manipulation of certain parts of the mechanism whereby the number of courses in a stocking had been reduced very materially, the result being a saving in the amount of silk put into the stocking. Manufacturers usually laid the blame for their troubles on the silk, and it was an excess of complaints that led to the investigation.

Securing Standards.

Four hundred women and girls, hosiery mill operatives and friends who consented to undergo the operation, submitted to leg measurements a week or two ago to enable a manufacturer in Reading, Pa., to approximate the several leg widths of hosiery necessary to properly fit average limbs in three groups classified as slim, medium and stout. The manufacturer who had the measurements made was President Kitzmiller of the Frank Y. Kitzmiller Sons Co., Notaseme brand of seamless hosiery for men, women and juveniles, and the object of passing the tape around the 400 limbs was to demonstrate that, unless knitted in various widths, no stocking, full fashioned or seamless, would fit a majority of limbs.

According to a statement by Mr. Kitzmiller, the women who lined up for a show of leg dimensions were selected

STANDARD KNITTERS

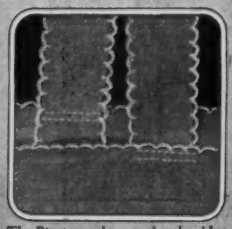
Children Want Fancy Stockings

With the growing demand for fancy stockings for children the hosiery manufacturer will find a welcome place for the Standard H Machine. This knitter with the attachment "C" will produce the horizontal stripes shown in the above fabric, which is in three colors. The vertical stripes are produced by the reversed plating method, or if desired a positive method of producing vertical stripes can be substituted.

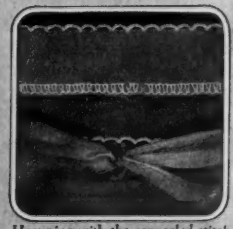
Our catalog which contains a vast amount of valuable information for the mill owner will be sent you upon request.

STANDARD-TRUMP BROS. MACHINE CO., *Wilmington, Del.*

JAMES BUILDING, CHATTANOOGA, TENN.

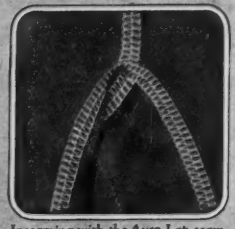


The Picoetta edge on the shoulder straps and top edge of garment performed with Union Special Style G.79000 B. It's durable and closely resembles hand work.



Hemming with the concealed stitch —the Union Special Style 15400 AQ. The stitch is hardly visable from the outside, yet it is as elastic as the maximum stretch of the garment.

Sewing arm shields. A Union Special Style 1700 G performs this operation with exceptional speed and perfection.



Inseaming with the Auto-Lap seam. The Auto-Lap is practically the only flat seam that can be produced on Rayon at a low cost.

THE RAYON GARMENT COMPLETE

finished on

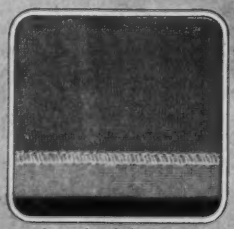
UNION SPECIAL MACHINES

WHICH means more than a well made garment—it also means a beautifully finished garment. It's the rare combination of strength and daintiness. Only in the Picoetta edging, as shown on the shoulder straps and top edge of the garment, can one find an ornamentation so attractive—then the attaching split tube border operation on the bottom of the garment with an ornamental seam. This makes a well chosen combination—and for perfect comfort to the wearer, the inseaming operation on the Auto-Lap—producing the strongest flat seam made. A garment such as this means a bigger value to the wearer and greater sales to the manufacturer.

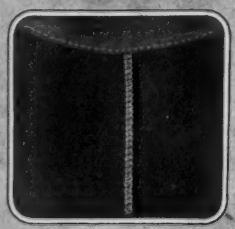
It might be well worth your investigation. Samples of operations are gratis — send for them.

UNION SPECIAL MACHINE COMPANY

400 North Franklin Street, Chicago



Attaching split tube border is accomplished with Union Special Style 13100 C. A variety of effects can be produced by varying the colors of the tubing and thread.



The overseam or closing seam is a tight, three thread stitch produced with Union Special Style 15400 AP.

Please send me, gratis, samples of operations performed on Rayon with Union Specials.

Name _____

Firm _____

Address _____

C2—Gray

at random, and the amazing discovery was made that not one among the number was favored with the possession of perfect limbs—that is, limbs conforming to commonly accepted standards as employed in passing on the eligibility of applicants for place in bathing beauty contests. Whether off-shape is common to Berks county women must be left for the moment to conjecture. Nevertheless, Mr. Kitzmiller accepted 20 of the 400 as models, from the limbs of three of whom plaster casts were made for a practical demonstration of the manufacturer's contention that there is a variance in leg formation that necessitates the knitting of more widths than has been common in order to meet the demand for fit.

Each of the 20 models wears a size 9½ stocking, but they represent eight sizes of ankle, the circumference ranging from 7½ to 10½ inches. There also were eight "styles" of calf, expressing style in circumference, and 13 sizes of leg two inches above the knee. From this it may be deduced that while it may be a simple matter to so apply tension as to knit three or four widths adapted to all of the varying sizes of either calf, ankle or farther up, it may not be so easy to knit to fit the entire leg at the several points where measurements were made.

While the figures expressing circumferences are impressive, aluminum forms made from the plaster casts, for demonstrating purposes, better visualize the variations in leg circumferences. While it is the intention of the Kitzmiller company to knit five widths, for the present only three are shown. For the slim, the measurements decided upon are 7¼-inch ankle, 12-inch calf and 13½ inches above the knee. The stocking for stout women is knitted 10½ inches at the ankle, 18 at calf and 23½ above the knee. The differences in circumference, it will be noted are, three inches ankle measurement, six inches at calf and 10 inches above the knee. The medium woman's stocking is knitted 7½ inches at the ankle, 14½ calf and 18½ above the knee.

That there is much lack of uniformity in the matter of symmetry is shown by the finding of 2½ inches variance in the calf dimensions of 7½-inch ankles. Fourteen-inch calf circumference is found on ankles of eight and 9½ inches respectively. The smallest calf, measuring 10½ inches, was on an ankle of 7½ inches, and this was the more nearly symmetrical of the 20 legs measured, the circumference above the knee being 13 inches.

With these figures before them, the Kitzmiller company will now proceed to show it is possible to fit the average limb with a seamless stocking. The aluminum casts, with size 9½ stockings drawn over them, as in actual service, will be shown at a number of style shows and demonstrations which are being arranged for retail stores in each of 20 cities.

Among the Knitting Mills.

A number of 36- and 39-gauge full-fashioned hosiery machines are being broken up, to be sold as scrap, by the Emmeth Textiles, Inc., Philadelphia, to make room for new Einseidel-Lieberknecht machines, some of which were put in place recently. It is stated by Marc Sternberg, president of the Emmeth Company, that the new equipment will comprise 50 machines of 48-, 51- and 54-gauge, all 24 section leggers and 28 section footers. The company sells to retailers. Before making women's full-fashioned silk hosiery, the company knit men's silk ties on

To Our Friends and Patrons:

We, the undersigned, wish to announce that, having developed a mutual respect for each other's products, policies and service, we have combined and enlarged our resources and merged our interests. We therefore take this opportunity of informing you that in the future the yarns bearing our trade names, GRISCO, A-BELL and MINGRO will be the output of our combined efforts, and will in every way measure up to our known standards of quality and service.

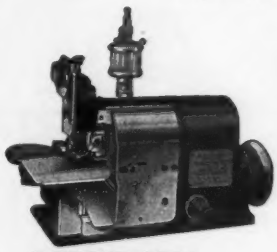
It has been our pleasure to serve you in the past and it is our hope to serve you in the future in proportion to our increased facilities.

THE GRISMAN COMPANY
AIBEL BROTHERS
MINDLIN & GROSS, INC.
COMMERCIAL RAYON DYEING CO., INC.

Consolidated under the title of

The YARNS CORP. OF AMERICA
40 WEST 20th STREET, NEW YORK CITY

MERROWING
Established 1838



HIGH SPEED TRIMMING AND OVERSEAMING, OVEREDGING AND SHELL STITCH MACHINES

For use on all kinds of knitted and woven fabrics.

MERROW
Reg. Trade Mark

Ask for details of our NEW STYLE 60ABB for simultaneously trimming and joining in a FLAT-BUTTED SEAM, the ends of cotton, woolen or silk piece goods for subsequent processes such as washing, bleaching, calendering, dyeing and printing, effecting substantial saving in labor and cloth.

Send us samples of your own fabrics to be seamed.

Quality and Quantity Production at Low Operating Cost

THE MERROW MACHINE COMPANY
16 Laurel St., Hartford, Conn., U. S. A.

ABERFOYLE MANUFACTURING COMPANY

MERCERIZED YARNS

JAMES BUILDING
CHATTANOOGA, TENN.

521 COURT STREET
READING, PA.

122 E. 7th STREET
LOS ANGELES, CALIF.

MAIN OFFICE
BANKERS TRUST BLDG.
PHILADELPHIA

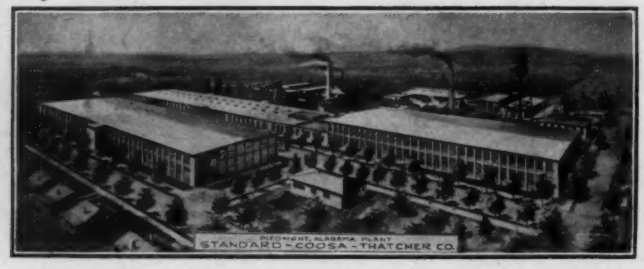
MILLS
CHESTER, PA.

323 SO. FRANKLIN ST.,
CHICAGO, ILL.

JOHNSTON BLDG.
CHARLOTTE, N. C.

WESTAWAY BUILDING
HAMILTON, CANADA

STANDARD
MERCERIZED YARNS



FOR best results mercerized yarns must possess uniformity, strength, lustre, evenness, and knitting economy.

STANDARD Mercerized Yarns are famous for these qualities.

STANDARD-COOSA-THATCHER CO.
CHATTANOOGA, TENN.
Sales Office: Lafayette Bldg., PHILADELPHIA
Canadian Representative:
Wm. B. Stewart & Sons, Ltd.,
TORONTO, MONTREAL

what is said to be the first Jacquard machine built in the United States. The ties contain three to five colors, and in each color bar there is knitted some design in self color. A machine of the construction employed will knit 36 ties simultaneously, no two having the same design.

The Gotham Silk Hosiery Co., Inc., recent purchasers of Onyx Hosiery, Inc., sold to Westminster, Ltd., its discontinued lines, and on January 11th, the largest public auction on record in the hosiery business was held when $2,000,000 worth of Onyx merchandise was offered. The Gotham company announces that it will continue to manufacture Onyx full-fashioned and Pointex silk stockings in addition to its regular line of Gotham Gold Stripe silk stockings in line with its former policy. Westminster, Ltd., has assumed all commitments of incoming Onyx infants', children's, and allied hosiery and will deliver orders of Onyx customers for this merchandise.

United States Knitting Mills, Inc., South Langhorne, Pa., is to establish a branch plant at Petersburg, Va., for manufacturing silk hosiery. The plant will be known as the Virginia Silk Hosiery Co., Inc.

Jerry-Jane, Inc., Los Angeles, California, has increased its capital stock to $1,000,000. The company manufactures sweaters and golf vests. The increase is to provide largely for additional promotional and advertising work.

A knitting mill has been started at San Antonio, Texas, by Philip and Paul Gentile. Bathing suits and sweater coats are being manufactured. 16 machines are installed at present.

Paducah Hosiery Mills, Paducah, Ky., have installed 14 Scott & Williams 3½-inch, 260-needle machines to their equipment, as well as two Smith-Drum rotary dyeing machines and an extractor. These mills also operate their own printing department.

Bungalow Rug Factory, Scottsboro, Ala., has started the manufacture of rugs, utilizing waste yarns from Scottsboro Hosiery Mills as material.

A two-story addition, 60 × 100 feet, is being erected at the Wilkes Hosiery Mills Co., North Wilkesboro, N. C.

Work is progressing on the new building of the Kingsport Hosiery Mills, Kingsport, Tenn., in which 12 full-fashioned machines will be installed.

Dunbar Knitting Mills, Dunbar, W. Va., have been incorporated for the manufacture of sweaters and other knit goods. The capital is $125,000. Paul Rose, of Passaic, N. J., L. A. Frasier, of Dunbar, and others are interested. A plant is being erected.

McAllister Hosiery Mills, Chattanooga, Tenn., have increased their capital stock from $175,000 to $250,000.

An additional building in which full-fashioned machinery will be installed is to be erected by the Golden Belt Manufacturing Company, Durham, N. C., it is announced, and 23 new machines have been ordered.

Cohen Bros. Mfg. Co., Inc., manufacturers and distributors of sportswear, have removed to larger quarters at 500 Seventh Avenue. The new quarters, comprising 27,500 square feet, are more than double the capacity of the former quarters. I. Peter Cohen, president, announces that the company has taken over the Victor Vassar knitting mills of Detroit, and that David R. Stocker, president of the Detroit company, has entered Cohen Brothers as vice-president in charge of production of swimming suits and children's staple sweaters.

Hosiery Mills—

Many mills have learned that the road to increased dividends is through the introduction to their trade of novelty combinations.

Our deliveries are growing weekly on combinations of Silk, Rayon and Celanese twisted with other fibres. This, as well as pure silk throwing, taken on a commission basis.

May we have the opportunity of demonstrating the saving made possible through this method of buying quality throwing?

DUPLAN
SILK CORPORATION

COMMISSION DEPATMENT

Southern Office — Johnston Bldg., Charlotte, N. C.
New York Office — 135 Madison Avenue

Mills at
Hazleton — Dorranceton — Nanticoke, Pa.

The Yarn Market

Philadelphia, Pa., January 18th, 1927.

The first week following the report here last month of the Philadelphia cotton yarn market was significant in producing further reductions in yarn values in this market. In the face of a statistically stronger raw cotton market, yarn rates slipped off in every department of the list, more than had been the case in about three months. Although cotton regained a 13-cent level during the week, Christmas found yarns at new low levels with very little enthusiasm manifested, only part of this being due to the approach of the festival period.

This week provided a period of retrospection, and it was generally conceded that the year 1926 had not contributed its share of prosperity in this market, although there had been short periods of activity, which did not endure sufficiently to become important. The entire year was marked by hard work on the part of spinners and dealers, apathy on the part of consumers, a continuation of hand-to-mouth purchasing, and frequent deadlocks between the selling and buying divisions as to price. Spinners as a rule maintained definite stands as to rates, demanding replacement values; while buyers were disinterested in yarn at rates above figures which they estimated as its value.

Such a situation greeted the arrival of a new calendar year, for which varying hopes are held so far as this yarn market is concerned. The next week of our month, which dismissed the old year and ushered in the new one, was not expected to provide much activity, because of the holiday season; yet, discounting this influence, business continued sluggish. The new year found the spinners continuing their ideas of determination on price, with buyers waiting for concessions, with the result that not very much forward business or large orders could be reported. During this week no effect was felt of the moderate recovery of price indulged in by cotton as the old year came to a close.

The first full week in the new year presented very little change in the situation. Spinners appeared to be stronger, somewhat, in their price demands, but their position did not strengthen the market values. Examples of their ideas are seen in quotations of 29 cents for 20s/2 carded warps, and 33 and 34 cents for 30s/2 of the same material. Business moved under these prices, it is true, but the majority of spinners seemed determined to bring up the values.

As a result of the combined influence of stronger cotton and spinners' determination, together with a noticeably increased inquiry in the market, prices demonstrated their first recovering strength during last week, and factors felt if they could be maintained, the market would come up to them and perhaps grow still stronger. The inquiry developed did not all materialize into business, but was taken as a harbinger of more activity for the remainder of January, and even further.

In connection with prices, there was continued discussion as to whether the spinning division has been wise in its attitude of determination. Experienced factors in the market pointed out that several times during the past month, the concession of a half a cent would have resulted in an influx of extraordinarily large amounts of business, but the spinners refused to yield. Justification for their stand might have been found in the renewed strength which this market is gaining at this writing, the end or duration of which cannot be forecast at the present time. If the spinners can attract the business at the higher rates, they of course are better off; but commitments would have come from concessions at the proper time, without notable loss, that might have provided comfortable operation. It seems entirely a matter of viewpoint until future developments reveal the correct attitude.

If there is an appreciable pick-up in cotton goods activity during the next six weeks, yarns will reflect this in an improved market. Up to the present time, weaving mills purchasing yarn are not contributing as much toward this end as are the knitting mills, which have been reasonably good customers lately.

Philadelphia prices on January 14 follow:

Single Skeins.

4s to 8s	23½	10s	24
12s	24½	14s	25
16s	25½	20s	27
24s	30	26s	31
30s	32		

Single Warps.

8s	24½	10s	25
12s	25½	14s	26
16s	26½	20s	27½
24s	31½	30s	32½
40s	42		

Carpet and Upholstery Yarn in Skeins.

8s 3-4 hard white warp twist	23
8s and 9s 3-4 tinged tube	20
8s 3-4 hard twist waste	19

Two-Ply Skeins.

8s	23½	10s	24½
12s	25	14s	25½
16s	26 @26½	20s	27 @27½
24s	30½	26s	31½
30s	32½	40s	41

Two-Ply Warps.

8s	25	10s	25½
12s	26	14s	26½
16s	27	20s	27½ @28
24s	31	26s	32
30s	33 @33½	40s	42

Frame Spun Carded Yarn on Cones.

8s	23	10s	23½
12s	24	14s	24½
16s	25	18s	26
20s	26½	22s	27 @27½
24s	28	26s	28½
30s	31 @31½	40s	40
30s double carded	32½	30s tying in	29½

Two-Ply Combed Peeler Skeins and Warps.

8s to 16s	35@36	20s	37@38
24s	40	30s	42@43
40s	47@47	50s	52@54
60s	57@60	70s	68@74
80s	80@83		

Single Combed Peeler Yarn on Cones.

18s	36	24s	39
30s	42	36s	45
38s	46@47	40s	48@49

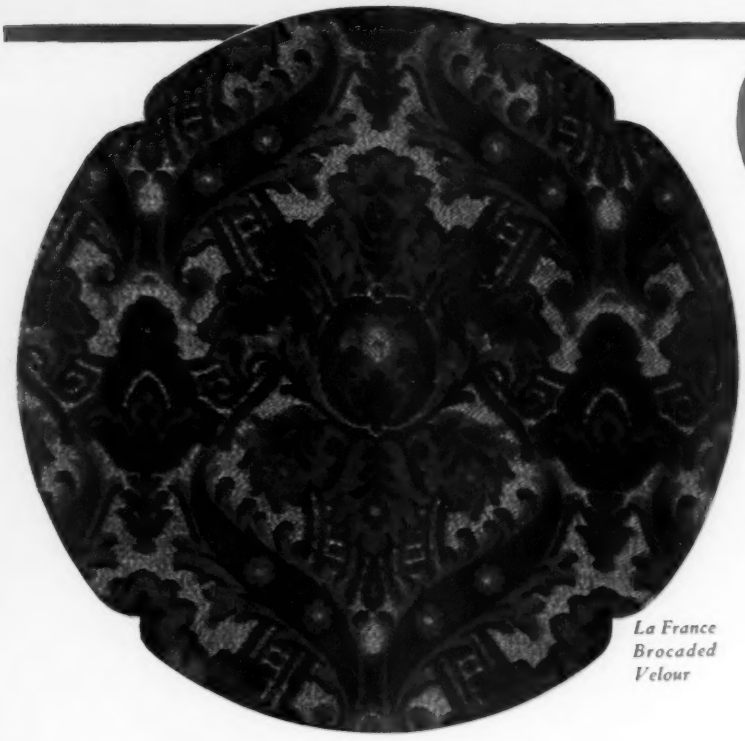
Mule Spun Carded Yarn on Cones.

10s	29	12s	30
14s	31	16s	32
18s	33	20s	33½
24s	34	26s	35
30s	36	40s	45

Mule Spun Combed Peeler Yarn on Cones.

10s	38	12s	38½
14s	39½	16s	40½
18s	41½	20s	42½
22s	43½	26s	45½
28s	46½	30s	47½
36s	50		

A new type of shaded stocking, distinctly an American creation, utilizing brilliant evening shades and designed to give the effect of slimness to the legs and ankles, is being shown in the Gotham Silk Hosiery Shops. The stocking is designed to give the effect of added gracefulness to the legs of wearers by the gradual shading of color, being most intense at the back and blending off to a very delicate tint along the front. This creation is called "Compose." An added feature of the new hose is the fact that they can be especially dyed to match any gown or street costume.



La France Brocaded Velour

COLOR the Master Salesman

LA FRANCE Textile Industries of Philadelphia are among the foremost weavers of tapestries, damasks, jacquards, velours, etc., in the United States. From January, 1924, up to the present time they have increased their business over 500%. This tremendous growth is attributed by them to their new line of multicolored fabrics.

We point with considerable pride to the fact that we were partly responsible for La France Textile Industries undertaking this new venture. We convinced them by consultation and experimentation that the Franklin Process could make multicolored brocaded velours a practical manufacturing proposition.

Franklin Process Dyeing has been adopted as standard for the pile of this fabric because it has consistently met the unusually severe requirements as to penetration and evenness of shades. Our prompt deliveries and generally good service have also materially assisted this customer in meeting the tremendous increase in sales. The yarn is dyed and delivered in the convenient parallel tube form, all ready for the creel. Production is thus speeded up and waste reduced.

What will colored yarns do for your sales? Let us give you the answer. Use the coupon NOW.

A
FRANKLIN PACKAGE
It will deliver freely either rotating or over end.

FRANKLIN PROCESS COMPANY

Largest Job Dyers of Yarn in America
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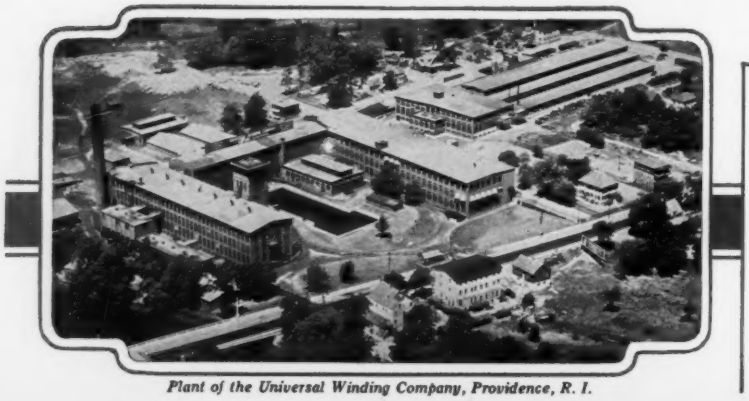

Plant of the Universal Winding Company, Providence, R. I.

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The Knit Goods Market

Cross currents in the knit goods market have had the effect of delaying the activity that should have developed in a buying movement for spring. But the stage appears to be set for briskness in hosiery in a general way, and substantial contracting for underwear by the more important jobbers. Shaker knit sweaters have been in fairly good call for immediate, and the outlook is for more early business in sweaters than in January and February a year ago. In each of the three divisions there is a strong situation in the making. Stocks among jobbers and retailers are lower than at the corresponding period in any recent year. This was shown in the fill in orders for heavy weight goods that reached mills day by day from the jobbing trade and in the fact retailers are constantly repeating.

While, it is apparent, there is accumulating a demand, merchants are looking for further price adjustments on silk, rayon and cotton goods. This is indicated in letters reaching mills from buyers, nearly all of whom want to know "what will be your new prices?" Such inquiry usually precedes by a week or more a jobber's order, when the reply of the mill is satisfactory.

Price is an element with which it is difficult to deal satisfactorily in any survey of the markets. While one or more mills may announce a revision, others remain silent, the disposition among manufacturers as well as distributors being to wait for developments. However, where business in knit goods has had a start for this year, it is gaining momentum, and the opinion is expressed by some leading factors that in the second quarter of the year sport goods in some knitted lines will be scarce.

While some manufacturers and jobbers say they are disappointed that there is no snap to the market, others tell of a volume of business exceeding that of the early months of 1926. A commission house having sole distribution of the products of several hosiery mills in North Carolina reports that sales to January 15 ran ahead of those for the entire month last year, the increase being expressed in dollars, which necessarily means more dozens. A representative jobbing house executive states that the business of the establishment in January was well ahead of that for the corresponding month in any year since 1920. Both reports apply to hosiery and underwear.

One explanation supplied by large factors is that prices are so much lower that distributors are less hesitant to operate. Losses were written off in the 1926 inventories, and those establishments that went deep enough have possibilities of profits which promise to compensate for the disappointments of last year. Those who did not, will find their high price carryover goods in sharp competition with merchandise bought at this year's values. It is the prevailing sentiment that 1926 purchases, which were not substantially marked down for inventorying, should be moved out with the least possible loss in time.

According to some leading jobbers, turnover last year was increasingly rapid, and will be this year. In certain lines affected by style changes there were obsolescence charges which could not have been contemplated and had to be or will have to be written off. This applies particularly to women's silk hosiery, juvenile hosiery and extremes in novelties in sweater lines. Having learned their lesson in the hard school of experience, jobbers are aiming at a more rapid turnover and groping for a method by which they can, with reasonable safety, put goods in stock in order to compete with manufacturers selling to the retail trade direct and providing what is, practically, a 24-hour delivery service, something of which a few jobbers can boast, with material advantage to their respective businesses.

Hosiery.

Outstanding in the recent happenings in the hosiery primary markets was the early January announcement of the Berkshire Knitting Mills of the spring prices for full fashioned silk hosiery for women, the reductions ranging from 15 to 75 cents a dozen. Some traders commenting on the new list say the adjustment is not satisfactory, maintaining that the prices of certain numbers are too low and that others are too high. However, the Berkshire was so well supplied with orders that the company cut the holiday vacation down to a one day, while operatives were asking for a week. The Nolde & Horst Co., knitting both full fashioned and seamless, compromised with employees by giving them a day and a half vacation, while ordinarily the company closes down from one to two weeks during the holiday period, for facilitating the matter of inventorying.

Numbers of the Philadelphia full fashioned mills selling to jobbers were closed from a week to ten days, while mills selling to retailers were operating with day and night shifts. One of the latter is selling for spring at the prices prevailing last year and the plant is employing two shifts of knitters, as is at least one in Reading. The direct-to-retailer manufacturers appear to be more comfortably situated than those distributing through jobbers exclusively.

Numbers of jobbers who have been slow to place their silk hosiery contracts conceived the notion that raw silk prices would decline and that in the sharp competition among manufacturers a reduction in wage schedules was not improbable. Several forecasters guessed wrong as to silk in their prophesy that a decline of 50 to 75 cents would be witnessed by spring. Two months have elapsed since such a forecast was given out, and silk has stubbornly refused to vindicate the prophets. As to wage revisions, jobbers who wait for them will be out of silk hose long before any such change goes into effect, if ever. There is probably no surplus production of silk hosiery, excepting of obsolete lines, and these are being sacrificed by unfortunate holders at a rate that promises to clear the market for more desirable goods in short order.

Full fashioned chiffon hosiery of 20-1 inch boot which a year ago was good value at $12 and more a dozen was dumped at $7.40 last month and was sold in certain department stores for 85 cents a pair, for regulars in the current popular colors. Certain distributors affect to believe there will come out from time to time similar lots, to the detriment of long boot goods. Few jobbers would buy them as a speculation. In fact, many complain they cannot compete with mills selling to retailers. For example, it is held that retailers can buy direct at 50 cents to one dollar a dozen below prices which jobbers would have to exact in order to derive a reasonable profit.

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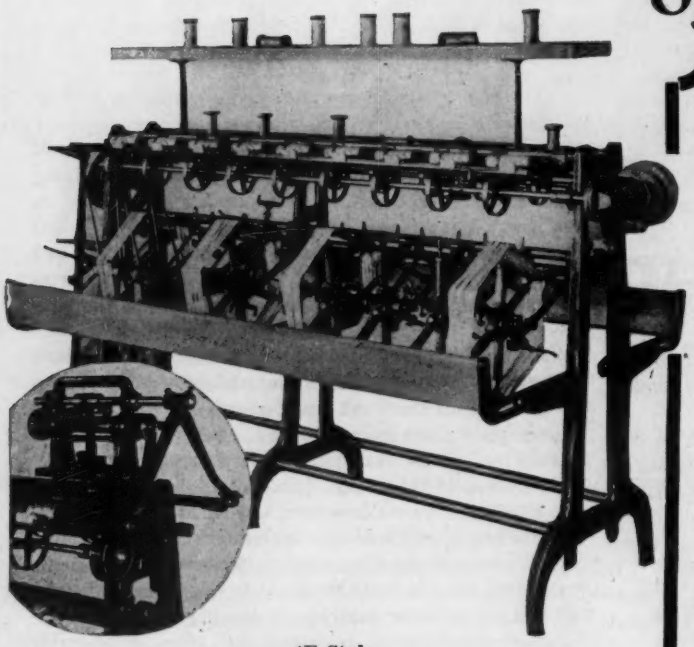

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The 5B Spinner

This is a combination Doubling and Twisting Frame for Tram Spinning—hosiery threads in silk, silk and cotton mixtures, and RAYON. Handles materials from 2 to 14 threads. Produces perfectly wound bobbins. Uniformity of production is assured by such improved features as the 2-inch feed roll, spindle swing holder and chain and sprocket drive.

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Atwood Machinery in Your Plant Means

Maximum Production
Satisfied Employees
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Quickest Results

ATWOOD

SILK THROWING MACHINERY

The more popular full fashioned silk is a four-inch welt stocking, and ranking second is the silk to top. While the prevailing sentiment in the trade as to chiffon hosiery is that it will lose none of its popularity of last year, some interests say there is an increasing drift to medium weight, in seven to eight thread silk. This seems purely a matter of guessing, and may be one explanation for the tardiness of jobbers to place order details promptly, leaving it to mills, at times, to either curtail their production or pile up stocks which might have to go the way of the 21-inch boot goods referred to. Uncertainty as to fabric weight is a more potent factor in jobber procrastination than either color or price. There seems little doubt that distributors very soon will have to decide for themselves what will be the better guess in stocking up for a brisk spring trade.

Direct-to-retailer mills reporting capacity business and dealers buying at an encouraging pace are, mostly, knitting silk hose extra long, maintaining that if there shall be any change in skirt length further brevity will be more likely than an addition of an inch or two. Of course, the long stocking is adapted to any skirt length. Some mills are knitting silk-to-welt hose 28 to 30 inches. It is pointed out that in this type of stocking it would be safe to take an inch off the welt, and that the all-silk could appropriately be knitted an inch shorter than at present, as a means for cutting down cost of production and giving distributors a longer margin of profit. It seems quite certain that as new prices come out it will be found there has been a change in construction without impairment of the stocking in point of both appearance and service.

With the full fashioned silk hosiery industry in the North becoming somewhat crowded, there is increasing interest in a stocking to sell at a dollar a pair, for better maintaining competition with seamless goods. The Northwood Hosiery Co., Philadelphia, has virtually promised such a stocking this year, having conducted a series of experiments with a combination of silk and rayon that are said to have resulted very satisfactorily. The Rosedale Knitting Co., in Reading, already is producing a stocking of silk and rayon in combination and is selling it to several very large distributors, and another large mill has a stocking of similar construction under serious consideration. That the silk-and-rayon full fashioned may go a long way toward displacing dollar all-silk boot seamless seems more than a mere probability.

More than one jobber has said he would rather sell the seamless than the full fashioned, for the reason it affords a better opportunity for adequate profit. But, they say also, "We must carry the full fashioned." Boosters for the seamless have contended all along that more of it could be sold if it were pushed, that the difficulty which it encounters is in the disposition of manufacturers to the line of least resistance and replace seamless equipment with full fashioned. Expansion in the latter division thus goes on and there is a steady decrease in the number of active seamless machines, both latch and spring needle.

Speaking generally, the seamless industry, in the North at least, is having a severe jolt. It is true some mills are well engaged, notably the Ipswich, in Massachusetts, which last year had an increase in its per cent of the total production over 1925. Several Reading mills also appear to be easily holding their own, notably with silk plaited on

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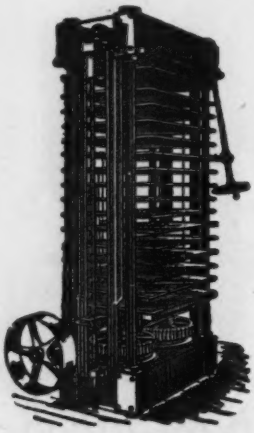

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FOR
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CARDED-COMBED-MERCERIZED
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MANUFACTURERS OF
Cotton Mercerized Tapes, Spool Tapes, Bindings and Narrow Fabrics for Underwear and other Trades.

rayon, and one for some time has been operating with two shifts of knitters. There is, however, a great deal of inactive seamless machinery, and several well known establishments are being quietly offered for sale. This is true also of a few Philadelphia full fashioned plants, for which there are buyers, but not at the price at which the plants are held. The Mock Judson Voehringer mill was sold a few weeks ago, and it is stated the purchaser is a company in Milwaukee selling direct to retailers. Two other manufacturers in the Central Northwest are in the market for full fashioned mills.

Acquisition of the Onyx by the Gotham Silk Hosiery Co., is believed to account for the establishing of plants in the East by manufacturers operating in the West. Regardless of where a mill may be situated, it must either establish one or more branch plants or maintain finished stocks in widely separated trade centers, in order to compete with the large concerns which make a practice of shipping goods out on the day orders are received. It is suggested by some that sections of the South are in a midway position for giving jobbers in the East and Central Southwest prompt service, and there is where this year's greatest expansion will be witnessed, it is predicted by some important factors.

Announcement that 250,000 dozen pairs of "Nationally known Onyx hosiery" was to be offered at auction by Wilmerding, Morris & Mitchell in New York on January 12 necessarily had the effect of keeping jobbers out of the primary markets in the first half of January. While, according to the publicity given to the sale while it still was in the future, most of the $2,000,000 worth of hosiery offered was of discontinued Onyx styles and colors, the effect on the regular trade was no less dampening. But now that the auction is a matter of the past and the prices obtained did not establish market values, distributors are in better position to place their commitments with reasonable safety. According to a rough estimate, the sale returned about $1,000,000 to the owners of the hosiery.

A Southern mill selling through George Taubel, in New York, is having a good run on a seamless stocking with a gun metal silk boot and black top and feet. It can be sold in retail stores at a dollar a pair on a close margin for dealers. The full fashioned of this construction still is being well received.

Rayon hosiery for women is coming to be more and more a price proposition, its use, apparently, declining as prices of seamless and full fashioned silk decline. The rayon stocking is feeling the effect also of free offerings of full mercerized that can be put over the counter profitably at 25 cents a pair. Between cotton and silk, rayon hosiery seems to be having the hardest run it ever experienced, while in combination with silk in high standards of construction it commands a fair market.

Primary market trading in misses hose seems to be pretty evenly divided as between the seven-eighth and the full length. The latter, in both plain and fancy leg, is believed to be gaining some ground for spring, and manufacturers of silk and silk-and-rayon lines express themselves as enthusiastic over the out look. In the seven-eighth length there is a tendency to solid colors for the leg proper and novelty effects for the roll top. Sports effect for juveniles seems to be restricted in no small way to golf hose, in which there has been an increasing business year by year, and sales promise to bulk large for 1927.

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Up to last month some few jobbers had not placed their initial orders for infants' socks, while among the leading houses there was considerable duplicating. Trading is, however, on a steady basis, and sales for the season are measuring up favorably with those in recent years. Probably the premier seller is an all-rayon sock which retailers can let go at a quarter a pair and fare very well in matter of return. All classes of hosiery for misses and their juniors have improved their position materially since December. Some lines of socks are sold up tight to April-May. Among the mills making misses fancy hose is one in Tennessee that is operating day and night, according to the New York selling agents.

Novelty in hosiery has its chief exposition in men's socks, and there seems little doubt that fancies will this year lose none of their potency as a leaven for the markets for hosiery generally. Wool hose, for men, women and juveniles still was being taken in January for current distribution, some of the repeat orders representing fairly large quantities. Thus far there has been little interest in wool lines for the next heavy weight season, but to jobbers who have looked samples over patterns and prices appear so satisfactory that there can be little doubt the fall business is just around the corner. At least one well known mill agent is in the market for a woman's full fashioned silk-and-wool account. Domestic wool hosiery is reported a very small item in the inventories of leading jobbers and retailers, but some of the latter carried over considerable British hose selling at $3.50 to $3.95 a pair.

A Pennsylvania manufacturer selling to jobbers and large retailers is showing first samples of men's half hose in six colors. But this does not represent the limit, as Scott & Williams, Inc., have a machine that knits seven colors. The socks in question are to pass over the counter at 50 cents a pair, a price that is as stable as cotton within a range of 50 points variation. A representative haberdashery reports total sales of half dollar socks in the 1926 light weight season exceeding those of all other prices, including plain color silk, combined.

As vertical and diagonal stripes and diamond and rectangular shapes large and small have displaced circular stripes, there necessarily is in the market a plenty of 1926 models, some of them flashy, others on the conservative order, and these leftovers which last year were priced a half dollar at the counter are available to retailers at $2.25 a dozen, for a quarter dollar proposition. And they are being sold quite freely by jobbers, who say retailers in some sections have no difficulty in maintaining the 50 cent price for the pick of the old patterns. Some of this year's models designed for that bracket are liable to get into the 25 cent class if they do not soon show fairly good movement. It is the policy of a few jobbers to declare a line obsolete if it does not get a good response in 60 days, and price it accordingly for a quick turnover and replacement with something that will move.

Striped half hose with a knitted-in clocking effect is being tried out by several mills in Reading, with what result it cannot be definitely stated. The vogue is bright colors on a more conservative order as to combinations than prevailed last year. The strictly collegiate will be taken very cautiously by most dealers, is the common opinion in the trade. Split foot construction seems to have a strong grip on masculine fancy. Plain color silk does not appear to be making the headway that was predicted for the chaste and dignified, and there is yet to develop that strong call for embroidery that has been predicted.

Underwear.

The business to the middle of January taken by several manufacturers of men's heavy weight cotton ribbed underwear who named prices in December was viewed in the New York primary market as indicating little activity until well along in February. One well known mill, according to an executive, booked but two contracts during the first three weeks following the opening. The line is staple as bed sheets and must be sold in competition. On the other hand, the contracts placed with a mill which enjoys a reputation for distinctiveness has had a gratifying volume of business. This mill last year established a high record for shipments, and the start made in 1927 is held as meaning even that record will be shattered. At the time the two mills referred to, making lines that are as dissimilar as cotton and silk, were inviting initial orders, many of the northern manufacturers had not named prices, so that January happenings in the underwear markets supplied no index of what might be in store for the early months.

Those who maintain that cotton underwear prices are lower, relatively, than the cost of producing cotton probably are not far wrong. Assuming this to be the case, there would appear no ground for long deferring contracts, for lower prices would be an industrial catastrophe and do not seem possible, barring national or international economic disaster arising from causes that the shrewdest cannot at this time foresee.

Underwear jobbers crawled out of a tight hole in 1926 without impairment of their contemplated returns. They came upon 1927 with unusually light stocks, and if there be any magic in lower prices they should have even a better year than the last. Retailers, mostly, could have carried no underwear over, for it was the common policy to buy in one-sixth dozen lots of sizes and numbers. They are pursuing that policy now, as to some light weights, but are reported buying more freely of certain lines than ordinarily at the beginning of a season in recent years. Their orders in the aggregate bulk large, according to jobbers, so that there seems no reason, other than a mistaken tendency to overconservatism, why distributors should hesitate to operate promptly and give mills opportunity to have supplies for what promises an eventually strong market. Necessarily there was warrant for putting off so long as some of the more important mills had not announced their new prices.

The action of the Atlas Underwear Co., in eliminating "Part wool" as a descriptive term for garments of wool and cotton in combination is, generally speaking, approved in the trade, some factors, however, taking a negative view. Part wool may be variously construed. The term loses its potency as a talking point where it is known that only enough wool is used to let the manufacturer get by. A good illustration is a woman's rayon stocking put out last year by a manufacturer who described it as silk and rayon. The only silk in the stocking as was a narrow stripe in the hem, not a quarter of an inch wide, of pure silk, and that was all the silk contained in the hose. The Atlas probably had the misleading descriptions of some mills in mind when the action referred to was taken. A safer descriptive term for underwear containing cotton and wool

might be "part cotton."

Judging from the reported early buying of men's nainsook athletic suits and the quantities contracted for by some of the larger merchants, it is evident many distributors look for further use this year of the nainsook garments and lessened patronage for the manufacturers of the knitted. Certain branded lines of nainsooks, which have become all-year-around sellers, have been bought rather heavily for spring and summer, although necessarily there must have been some carryover stocks. Gaining in favor is the knitted shirt and running pants of jean or nainsook or some similar fabric—the shirt as an absorbent and the drawers for freedom of leg movement.

Men's rayon union suits sold to jobbers and large retailers by a New York Fifth avenue firm of mill agents specializing in fancy knit goods, is being stocked by retailers more generally. The rayon union suit in medium grades, probably will pass over the counter at $2. Another candidate for favor in underwear lines is the step-in suit for men. It is of various forms of construction—all-cotton, all-rayon and cotton and rayon in combination. The retail price of a cotton-rayon suit is $2, the all rayon, for the more fastidious, costing him around $4. There is unmistakably a drift in men's summer underwear to the use of less cotton, whether through substitution of fiber or further abbreviation in fabric.

The business placed with manufacturers of women's light weight cotton underwear encourages some of the leaders in this division to believe their shipments this year will run ahead of those for 1926. While some of the Pennsylvania mills are in need of light weight business, a few are operating to capacity and have a fair amount of forward business on their books. Generally speaking, only a very small part of the buying for jobbers, chain stores and catalog houses had been done to the middle of January.

As indicating an increasing use of women's medium weight cotton union suits, several of the Schuylkill Valley mills in January received repeat orders for from three to five cases each, showing distributors had under-estimated their needs. Shipments of children's cotton underwear assumed larger proportions than a year ago. Only a few of the Pennsylvania mills make these garments for the younger juveniles, but those which do are reported busy, and one had an increase of more than 50 per cent in shipments to January than in the corresponding period of 1925-6.

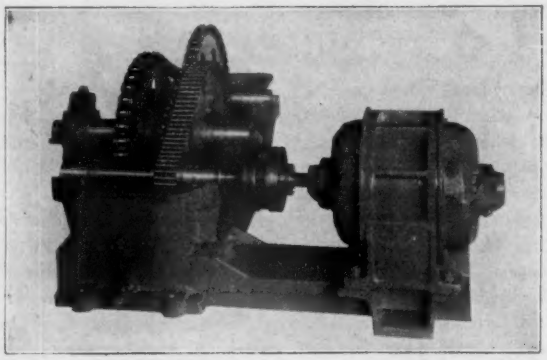
Sweaters.

Considering the light business placed with manufacturers of sweaters, the opening for fall and winter seems to have been staged about two months too early. This is the opinion of some leading mill executives. There still are coming through a few orders for shaker knit coats for the current season, but these are not sufficient in the aggregate to keep more than three or four fair size mills employed, it is stated by observers.

There is more confidence in sweaters than existed eight or ten months ago, and it is believed that later most manufacturers of well established lines will have all the orders they can handle in season. Staples and sports coats with just enough color to make them distinctive, but lacking in jazz, look like a good merchandising guess for the heavy weight season. Last year the button-up coat, for men and women, monopolized a large part of the trade. At the moment the V neck slip-on seems to be coming to the front. It is shown in solid college colors, with a touch of some contrasting hue, and jobbers say coats to retail at around $5 will be the better sellers.

Roller Chain Used in Speed Reducer Design.

A new and interesting application of Diamond high speed roller chain is shown in the accompanying illustration of a speed reducer. On the main drive triple-strand chain is used and single-strand on the two reduction drives. As with gear reducers, the entire mechanism is enclosed and the chains and sprockets run in oil. This speed reducer, made by the Washington Machinery Depot of Ta-



coma, Washington, is unusually accessible, the use of roller chain permitting the transmission of power in the same direction without the use of idlers. The particular advantage of this type of design, is said to be that the transmission efficiency and silent operation is preserved because of the inherent characteristics of roller chain in automatically absorbing wear on sprocket or chain through the mounting of the chain on the machine cut steel sprockets. The roller chain used is made by the Diamond Chain & Mfg. Co., of Indianapolis.

In 1894 the Acme Staple Co., began the manufacture of binders, tackers and staples. Today there is not an industry whose products require tagging that is not a field for the Acme staples and binders.

This growth and development is reflected in a new addition to the factory building at Camden, N. J., just completed, which increases the factory capacity 50 per cent. Maintaining the standard of quality in the production of staple binding and tacking machines and staples has, with them, proven a successful policy.

The steady increase of their foreign business is especially gratifying, it is said, together with the satisfaction of maintaining their home trade, and the extension of their specialties into new channels. It is pointed out that the Acme is the only company making staple binders and staples complete from the raw material to the finished product in its own factory.

J. H. LAURENS has become superintendent of Mills Nos. 1 and 2, Chadwick-Hoskins Company, Charlotte, N. C. He was formerly overseer of weaving at the Dunean Mills, Greenville, S. C.